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Supreme Court of the United States

OCTOBER TERM, 1991

ROSEMARIE CHRISTOPHERSEN,
SURVIVING SPOUSE OF ALBERT ROY CHRISTOPHERSEN,
DECEASED, AND STEVEN ROY CHRISTOPHERSEN,
Petitioners,

v.

ALLIED-SIGNAL CORPORATION, INCO ALLOYS
INTERNATIONAL, INC., UNITED CATALYSTS, INC.,
THE HALL CHEMICAL COMPANY,
MARATHON MANUFACTURING COMPANY, AND
CP CHEMICALS, INC.,
Respondents.

ON PETITION FOR WRIT OF CERTIORARI TO THE
UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

PETITION FOR WRIT OF CERTIORARI

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QUESTION PRESENTED

Should this Court permit the *en banc* Fifth Circuit, in conflict with other Circuits, to exclude from jury consideration expert testimony deemed unreliable and "not scientifically correct," through reliance on common-law notions that predate and find no analogue in the Federal Rules of Evidence?

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OPINIONS BELOW

The *en banc* decision of the United States Court of Appeals for the Fifth Circuit affirming the district court's grant of summary judgment for respondents is dated August 15, 1991, is reported at 939 F.2d 1106, and is reprinted as Appendix A, at page A1. The original Fifth Circuit panel opinion reversing the district court and remanding is dated June 4, 1990, is reported at 902 F.2d 362 (opinion) and 914 F.2d 67 (grant of rehearing *en banc*), and is reprinted as Appendix B, at page A56. The Order of the United States District Court for the Western District of Texas, from which appeal was taken, is dated October 12, 1989, is unreported, and is reprinted as appendix C, at page A66.

JURISDICTION

The *en banc* decision of the Court of Appeals was announced on August 15, 1991. The jurisdiction of this Court is invoked under 28 U.S.C. § 1254(1).

STATUTORY AND CONSTITUTIONAL PROVISIONS INVOLVED

The Federal Rules of Evidence were enacted by Congress as a statute in 1975, Pub. L. No. 93-595, 88 Stat. 1926 (1975), 28 U.S.C app. (1988). Rule 703 provides:

> **Rule 703. Bases of Opinion Testimony**
> The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

The Seventh Amendment to the United States Constitution provides:

> In Suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by jury, shall be re-examined in any Court of the United States, than according to the rules of the common law.

STATEMENT OF THE CASE

This case sharply focuses a crucial, recurring issue on which there is a fundamental split in the Circuits: May federal trial judges exclude from jury consideration expert testimony they deem unreliable and "not scientifically correct," by relying on common-law notions that predate and find no analogue in the Federal Rules of Evidence? In recent years, culminating in the instant case, the Fifth Circuit and six others have approved exclusion of disfavored expert opinion by invoking the common-law rule of *Frye v. United States*, 293 F. 1013 (D.C.Cir. 1923).[1] In contrast, the Third Circuit has firmly rejected use of the *Frye* test to bar expert testimony, finding it incompatible with the Rules, and other circuits have seriously questioned and criticized *Frye*.[2] Also in recent years, as sharply posed by this case, the Fifth Circuit and two others have sought to reenact judicial common-law control of expert testimony by pioneering an expanded, wholly unwarranted interpretation of Federal Rule of Evidence 703.[3] A total of seven circuits have rejected this approach, limiting Rule 703 to its plain, clear language.[4]

Five years ago, two Justices of this Court indicated the need to resolve the circuit conflict over the sole issue of whether the Federal Rules of Evidence superseded or implicitly incorporated *Frye*. *See United States v. Mustafa*, 22 M.J. 165 (C.M.A.), *cert. denied*, 479 U.S. 953 (1986) (White, J., joined by Brennan, J., dissenting). The closely followed and widely publicized *en banc* decision of the Fifth Circuit in this case, particularly given the sharp criticism of that decision by five of the *en banc* judges, presents an unusually well-ventilated and timely vehicle for final resolution of this conflict as well as the conflict over Rule 703 and the expert testimony rules generally, which have only grown during the last five years and

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[1] The others are the Second, Fourth, Sixth, Seventh, Eighth and D.C. Circuits. *See* note 11, *infra*.

[2] *See* A45-A46 n.41; p. 14, *infra*.

[3] At least the Second and Tenth Circuits, in addition to the Fifth, follow this approach. *See* note 15, *infra*.

[4] The First, Third, Fourth, Sixth, Seventh, Eighth and Ninth Circuits all reject the Fifth Circuit's construction of Rule 703. *See* pp. 21-25, *infra*.

show no signs of abating.

1. Background

In this case, the district court granted summary judgment against the survivors of Albert Christophersen, an engineer who died of a rare form of colon cancer after years of exposure to nickel and cadmium fumes from respondent Marathon's plant in Waco, Texas. A2, A28-A30. As with most toxic tort cases, petitioners needed expert opinion testimony to establish causation. They therefore proffered the affidavit of Lawrence Miller, M.D., a Tufts University internist and toxicologist. Dr. Miller noted the evidence in the record, including an affidavit by another Marathon employee, that Mr. Christophersen was repeatedly exposed to nickel and cadmium fumes, and Dr. Miller reviewed medical literature linking nickel and/or cadmium exposure to lung, kidney and prostate cancer. Drawing on the similarities between, on the one hand, the chemicals and exposures associated with small-cell lung cancer caused by nickel and cadmium, and, on the other hand, the chemicals and exposures associated with Mr. Christophersen's small-cell colon cancer, A14-A15, and noting the absence in Mr. Christophersen's medical records of any other explanatory risk factor, Dr. Miller concluded it was more likely than not that exposure to nickel and cadmium caused Mr. Christophersen's cancer. A28-A34.

The district court excluded Dr. Miller's opinion from evidence, pronouncing it "not scientifically correct," A73, and inherently unreliable in light of the contrary opinions of defense experts. In reaching this remarkable conclusion, the district court cited and loosely paraphrased some of the language of Federal Rules of Evidence 403 and 703: "Dr. Miller's testimony should be stricken as it is not based upon the type of evidence usually relied upon by experts in the field of cancer research. The introduction of Dr. Miller's testimony at a trial would be more prejudicial than probative." A74.

A panel of the Fifth Circuit unanimously reversed, concluding that the district court "simply chose sides in this battle of the experts and therefore usurped the role of the jury in evaluating the evidence and the credibility of expert witnesses." A62.

2. The Majority *En Banc* Opinion

On rehearing *en banc*, the full Fifth Circuit, through a *per curiam*

opinion joined by eight of the thirteen judges (A1-A55), reversed the panel, thus reinstating the district court's grant of summary judgment to defendants. The *en banc* majority opinion concluded that Dr. Miller's testimony failed to clear two separate "hurdles," A16, each of which the majority deemed essential to admissibility: the D.C. Circuit's *Frye* opinion and Federal Rule of Evidence 703.[5]

(a) The "Frye" Test. In justifying its decision to exclude Dr. Miller's testimony, the *en banc* majority relied on a ground the district court had nowhere mentioned: a common-law test based not on any Federal Rule of Evidence but purportedly borrowed from the D.C. Circuit's 1923 *Frye* opinion. As the *en banc* majority put it, *Frye* asks "whether the methodology or reasoning that the expert uses to connect the facts to his conclusion is generally accepted within the relevant scientific community." A14.

In a two-paragraph discussion, the majority concluded that Dr. Miller's testimony failed this test. Crediting the affidavits of two defense experts who opined sweepingly that Dr. Miller's theory "has no support in medical science and is without foundation," A15, the *en banc* majority held that Dr. Miller's opinion was simply "a scientific hunch, which as far as the record shows, no one else shares." A15.

The *en banc* majority made plain that, under its version of the *Frye* test, a district court may refuse to submit to a jury any expert opinion that it believes is incorrect -- as long as the district court takes care to employ the proper verbiage. The majority scolded the district court for finding "that 'Dr. Miller's conclusion . . . is "without precedent in cancer epidemiology and is not scientifically *correct*."'" A15 (emphasis added). It held that "[t]his finding of what is a scientifically *correct* conclusion is not for the district court." *Ibid.* (emphasis added). Nevertheless, the majority upheld the exclusion because it found that the district court *must* have

[5] The majority stated that there were actually four "hurdles" which expert testimony had to clear to be admissible, A5: Rules 702 and 403, in addition to Rule 703 and *Frye*. However, the majority did not rely on Rule 702 (which concerns the qualifications of experts), noting that the District Court had not based its exclusion on this ground. A9-A10. Nor did the majority rely on Rule 403 (which excludes evidence judged substantially more prejudicial than probative), choosing to end its opinion after having concluded that Dr. Miller's opinion "failed to clear either the Rule 703 or the *Frye* hurdle." A16.

concluded, "albeit implicitly, that Dr. Miller's testimony failed to meet . . . the *Frye* test." *Ibid.* Under the majority's approach, as long as one side's expert opines that the other side's expert is using reasoning that "has no support," is "without foundation," and/or is "without precedent," A15, and as long as the district court is careful not to trespass *formally* on the jury's domain by opining as to what is "scientifically correct," A15, the district court may weigh the opinions, believe the first expert, and simply exclude the other expert's opinion from evidence.

(b) Rule 703. The second hurdle that the majority found Dr. Miller's opinion failed to clear was Rule 703. In an unusual discussion evincing lack of confidence in its own analysis, the majority concluded that Rule 703 should be fashioned into a "tool" that a trial court may employ to exclude opinions that are premised on "untrustworthy" facts or data. A13.

At the outset of its discussion, the *en banc* majority acknowledged that the crux of Rule 703 concerns whether or not the facts and data relied on by an expert are admissible. The *second* sentence of Rule 703 -- requiring the court to ask whether the facts and data on which the expert relied are "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject" -- is, as the majority put it, "applicable only if the facts and data relied upon are not independently admissible." A6 & n.4. This concession was textually required: the *first* sentence of Rule 703 explicitly permits an expert to base an opinion on *any* facts or data which *are* independently admissible -- i.e., those facts or data which are "perceived by or made known to the expert at or before the hearing" -- with no further inquiry under Rule 703.

Unfortunately, the majority then abandoned this basic textual analysis. It first opined that Rule 703 is only "*primarily* directed toward permitting an expert to base his opinion on hearsay or otherwise inadmissible sources," and that a court's "inquiry into the 'types' of 'facts and data' underlying an expert's testimony is not *limited* to the admissibility of that data." A13 (emphasis added). The majority then announced a second sharp departure from Rule 703's text: It held that the rule required not merely an examination of the reasonableness of the "types" of facts and opinions relied upon, as Rule 703's terms appear to require, but also the "sufficiency and accuracy" of the *specific* facts and data relied upon. Any

other interpretation, the majority worried, would "render Rule 703 impotent as a tool for testing the trustworthiness of the facts and data underlying the expert's opinion in a given trial." A13 (emphasis added).[6]

Consistent with this reinterpretation of Rule 703, the majority summarized defendants' criticisms directed at the specificity and weight of the Marathon co-worker affidavit on which Dr. Miller had relied in forming his opinion, even though the district court -- and, for that matter, the *en banc* majority -- never suggested that this affidavit was *inadmissable*. A11. Citing these criticisms of the co-worker affidavit, the majority concluded that the district court did not err in invoking Rule 703 to exclude Dr. Miller's opinion, because Rule 703 requires exclusion where the specific facts and data on which the expert relies "are critically inaccurate and incomplete, as determined by what other experts would or would not be willing to base opinions on." A14.

3. The Opinions of the Four Dissenters

Four judges dissented, all joining in an opinion by Judge Reavley (A27-A52), and in a brief second dissent by Judge King (A52-A55), which charged that "[t]he majority, so willing to decry judicial activism in other contexts . . . engages in the worst sort of judicial legislation" and "judicially amends the Federal Rules of Evidence." A54. Noting that Fifth Circuit judges had previously sent "warning signals about their displeasure with expert testimony" and had

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[6] Immediately thereafter the *en banc* majority appeared to switch gears again, as if acknowledging weakness in its legal theory that Rule 703 is a sufficient basis for excluding opinions based on assertedly untrustworthy, but admissible, evidence:

> Certainly nothing in Rule 703 requires a court to admit an opinion based on facts that are indisputably wrong. Even if Rule 703 will not require the exclusion of such an unfounded opinion, general principles of relevance will. In other words, an opinion based totally on incorrect facts will not speak to the case at hand and hence will be irrelevant. In any event such an opinion will not advance the express goal of "assisting the trier of fact" under Rule 702.

A13. Yet the relevance of petitioners' expert testimony was assumed by the district court and conceded by the *en banc* majority, A5 n.3, and the majority declined to address the Rule 702 issue. A9-A10. In any event, in the very next paragraph -- the concluding paragraph of its discussion of Rule 703 -- the majority reaffirmed its conclusion that "when the facts and data are critically inaccurate or incomplete" they would "lack the necessary requisites of Rule 703." A14.

proclaimed as early as 1986 that "'it is time to take hold of expert testimony in federal trials,'" A27 & n.1 (quoting *In re Air Crash Disaster at New Orleans*, 795 F.2d 1230, 1234 (5th Cir. 1986)), the dissenters complained that "[t]oday the court 'takes hold' of expert testimony by taking over." A27. The dissenters stated that the majority's approach

> effectively allows judges to decide the reliability, weight, and relative merit of expert opinions, at least in toxic tort cases . . . . . confuses the admissibility of evidence with the sufficiency of evidence, changes the rules of evidence without benefit of amendment, denies Mrs. Christophersen her right to trial by jury, and eliminates substantive rights in tort cases where federal courts have only diversity jurisdiction.

A27.

In their *Frye* analysis -- with which Chief Judge Clark, in a separate opinion, "completely agree[d]," A23 -- the dissenters argued that continued use of the common-law *Frye* test -- which, they noted, several circuits have sharply criticized[7] -- is incompatible with the Supreme Court's own "plain-meaning standard for interpreting the Federal Rules of Evidence," and its championing of the adversarial process in the field of expert testimony. A45-A46 n.41; *see also* A35.

The dissenters further charged that the majority opinion represented a massive expansion of *Frye*. Whereas in past cases, the Fifth Circuit and other circuits had confined *Frye* to its original context -- i.e., excluding evidence based on particular novel scientific *techniques*, like "polygraph examinations, post-hypnotic testimony, and voice stress analysis," A45 & n.39 -- here, the *en banc* majority was reaching beyond such "novel device[s] or technique[s] and subject[ing] expert *reasoning* to judge-determined reliability." A45. "If his study and the reasons for his opinion are Dr. Miller's 'methodology,' nothing distinguishes his methods from those of other experts." A47. These, the dissenters urged, were surely matters for the jury and could not be countermanded on a judicial

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[7] The dissenters cited *United States v. Williams*, 583 F.2d 1194, 1198 (2nd Cir. 1978), *cert. denied*, 439 U.S. 1117 (1979); *United States v. Downing*, 753 F.2d 1224, 1236-37 (3rd Cir. 1985); and *United States v. Baller*, 519 F.2d 463, 466 (4th Cir.), *cert. denied*, 423 U.S. 1019 (1975). A45-A46 n. 41.

finding of a lack of "general acceptance." A48.

The dissenters also contended that the majority misused Rule 703, concluding, based on the "plain language" of the rule, that it does not justify excluding an expert's testimony based on supposed weaknesses in the underlying testimony of a fact witness. A40-A44.[8]

The dissenters further concluded that the majority's overall approach "goes beyond that proper scope of a rule of evidence because it dramatically affects substantive rights in whole categories of cases," such as claims based on rare diseases or those in the early stages of investigation, A53-A54 n.2, and thus usurps the role of states in providing the substantive law that controls in diversity cases under *Erie Railroad Co. v. Tompkins*, 304 U.S. 64 (1938). A54-A55; *see also* A51-A52.[9]

The dissenters also stressed that the majority's approach usurps the role of Congress by effectively amending the Federal Rules of Evidence, A54, pointing out in particular that the majority had ignored the fundamental faith placed in the adversarial system by Congress when it enacted the expert testimony rules (as explicitly recognized by the Third Circuit), A35-A36, and the various tools Congress provided for enhancing this adversarial system. A39-A40. They pointed out that "[i]f the Federal Rules of Evidence are inadequate in this context . . . then Congress, who enacted them, is

[8] The dissenters concluded, moreover, that "Dr. Miller expressly considered and dispatched in his deposition" the supposed deficiencies in the underlying factual testimony and concluded that the record "does not discredit the factual basis of Dr. Miller's opinion." A42, A44.

[9] Recognizing that Texas substantive law controlled the case, the dissenters noted that "Texas courts in civil cases have never cited *Frye* and do not employ a 'general acceptance' test for expert testimony," A51 n.48, and that "[t]he Texas courts would clearly permit [a case not meeting "general acceptance"] to go to trial and the jury to assess the weight and sufficiency of the plaintiff's evidence." A54 n.2. The dissent therefore concluded that the *en banc* majority's rules "sharply curtail claimants' substantive horizons and thus invade 'evidentiary rules . . . so bound up with state substantive law that federal courts sitting in Texas should accord [them] the same treatment as state courts in order to give full effect to Texas' substantive policy.'" A51-52 & n.50 (citation omitted) (ellipses and brackets in original). The dissenters emphasized that "[t]his lack of congruence with the state courts in cases dependent on our diversity jurisdiction is fundamentally at odds with the Supreme Court's decision in *Erie*" and that "[a]s a result, we encourage reverse forum shopping and deprive plaintiffs of the substantive rights that should be available to them under state law." A55.

the proper branch to amend or repeal them. If a federal substantive rule needs to be devised to supplant state law criteria for recovery, then Congress is the proper branch to devise it." A54.

In summary, the dissenters explained that the *en banc* majority's ruling was "[b]ased on an intellectual elitism that prefers to entrust scientific evaluation to a judge, trained in law, rather than to the good sense of the community," A54, and that the majority had sent "a clear message to the district courts":

> Henceforth, a dispute among qualified experts as to the appropriate scientific methodology or reasoning that an expert in the particular field should use to connect the facts to his conclusions is to be resolved by the district judge. If the district judge resolves this aspect of the battle among the experts by concluding that the plaintiff's expert has employed a methodology or reasoning which has not gained general acceptance in the scientific community, the case is to be terminated before trial. The jury will no longer be the arbiter of disputes over alternative forms of scientific methodology or reasoning.

A52-A53. Calling the *per curiam* opinion "the worst sort of judicial legislation," which "tramples on fundamental Constitutional principles" -- "the separation of powers between Congress and the federal courts, the right to a jury trial and the role of the states in our federal system" -- and which through its "result-oriented decision-making" designed to "tilt toxic tort litigation in favor of defendants . . . can only erode respect for the federal judiciary," A54-A55, the dissenters concluded:

> Congress has not ordered these changes in the Federal Rules of Evidence. Nor has the Supreme Court done so. By what possible right do we do so? And now where do we turn for an appreciation of federalism and judicial restraint?

A52.

4. The Opinion of Chief Judge Clark

Chief Judge Clark concurred in the result only, rejecting, as did the dissenters, both *Frye* and Rule 703 as bases for excluding the expert testimony. A16-A27. He began by observing that "[t]he plain words of the carefully created, thoroughly reviewed, fully annotated Federal Rules of Evidence are for courts to follow, not

embellish." A16. Chief Judge Clark characterized the *per curiam* approach of the *en banc* majority as a "homemade test" that "distorts or ignores the letter and spirit of the Federal Rules of Evidence" and "not only disregards the plain meaning of the rules, but also builds in a headwind favoring exclusion of such evidence on a far broader basis than the rules permit." A16.

With respect to the *Frye* test, Chief Judge Clark completely agreed with the four dissenting judges that the *en banc* majority committed grave legal error and added: "[I]f *Frye* is a rule of evidence, it has not survived the enactment of the Federal Rules of Evidence. . . . [I]f it is a substantive rule, its adoption in diversity cases is foreclosed by *Erie*." A23 (citations omitted).

In a meticulous discussion, Chief Judge Clark also sharply criticized the majority's discussion of Rule 703 as an unwarranted departure from the plain language and history of the rule. *See* A17-23. In brief, Chief Judge Clark found that it was plain from the "two clear English sentences" comprising Rule 703, A17, that

> (1) as the majority itself initially admitted but later ignored, the rule's "reliability inquiry only applies when the expert's facts and data are inadmissable" and thus should not have applied to the co-worker affidavit concerning Christophersen's exposure to nickel and cadmium (and other facts and data on which Dr. Miller relied), which "should have been considered admissible in evidence," A19-A22; and
>
> (2) contrary to the majority's conclusion, Rule 703 does not require that experts in the field "would have reasonably relied on the *particular* facts and data used by Dr. Miller" -- only that such experts "would have reasonably relied on facts or data of this 'type' in forming opinion or inferences 'upon the subject' of cancer causation" (emphasis in original). A22.

The district court's exclusion of Dr. Miller's opinion therefore "was premised on an incorrect legal interpretation of Rule 703 that would deprive a jury of evidence it should be able to consider." A23.[10]

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[10] Chief Judge Clark concluded that Federal Rule of Evidence 403, which the majority declined to consider, *see* note 5, *supra*, nonetheless justified excluding Dr. Miller's testimony because he viewed that testimony as lacking in reliability and thus more prejudicial than probative, and on that basis alone concurred in the result. A25-26. The dissenters, criticizing Chief Judge Clark's use of Rule 403, contended that the risk that a jury might credit testimony that a judge considers unreliable, without more, could not meet the definition of "unfair prejudice" under Rule 403, and that Chief Judge Clark's construction could not be squared with the adversarial system for handling expert testimony and was simply another means of allowing "judges to decide the reliability and relative merit of conflicting expert opinions." A50.

REASONS FOR GRANTING THE WRIT

As emphasized by the *en banc* dissenters, *see* A45-A46 n.41, this Court has instructed the lower federal courts to follow a "plain meaning" approach to the Federal Rules of Evidence, given that they represent a statute of Congress rather than a corpus of procedure promulgated by judges. *See Beech Aircraft v. Rainey*, 488 U.S. 153, 163 (1988); *see also United States v. Rogers*, 918 F.2d 207, 209 (D.C. Cir. 1990) (per Thomas, J.). Moreover, the dissenters emphasized that, even in the face of constitutional objections by a criminal defendant, this Court has strongly endorsed the virtues of permitting the trier of fact to review potentially probative expert testimony. A35-A36 & nn. 9-11 (extensively quoting *Barefoot v. Estelle*, 463 U.S. 880, 898, 899 n.7, 904 (1983)).

Yet these prominent decisions of this Court were not heeded, or even discussed, by the *en banc* majority, which simply proceeded as if it had *carte blanche* to create its own evidentiary rules unconstrained by clear statutory language or by constitutional principles governing the role of the jury, the power of Congress to make policy choices in structuring the operations of the Judicial Branch, or the interest of the states in protecting their substantive law from the result-oriented doubts of judges exercising diversity jurisdiction.

The inattention to these and other rather elementary points stressed by the dissenters, by an *en banc* majority of an influential circuit, underscores the need for this Court to grant review to clarify the basic meaning of the expert testimony provisions of the Rules. A substantial portion of the Federal Judiciary is laboring under the mistaken assumption that federal judges are entitled to employ their own *ad hoc* means of closely regulating which expert testimony reaches the jury, and excluding testimony that these judges feel lacks a "reliable basis" or is not "generally accepted" -- as judges did for decades under the common law. Their rulings in this area are in complete conflict with the rulings of judges who

have recognized that -- whether they like it or not -- in 1975 Congress made a plain policy choice to *override* this old common law system, and to replace it with a set of clearly written, straightforward rules for federal judges to follow.

The conflict has been particularly acute over the two grounds relied on by the *en banc* majority. The Third Circuit has expressly repudiated the *Frye* test as both incompatible with the Rules and unwise; but several circuits join the Fifth Circuit and employ *Frye*, at least to a limited degree. (Part I-A, *infra*.) Most circuits have expressly repudiated the Fifth Circuit's use of Rule 703 to exclude testimony based on a judgment of its weight in a particular case, although two circuits have agreed with the Fifth Circuit's view. (Part I-B, *infra*.) Certiorari is warranted on these statutory conflicts alone, given Congress's strong desire for *uniform* rules of evidence, and given the injustice of uneven application of the evidence rules and the forum-shopping incentives these conflicts create, particularly in the toxic tort field. (Part I-C, *infra*.) Moreover, the *en banc* majority opinion and similar decisions in other circuits pose the gravest constitutional concerns. (Part II, *infra*.)

I. THE *EN BANC* COURT'S HOLDING VIOLATES THE PLAIN LANGUAGE OF THE FEDERAL RULES OF EVIDENCE AND FUNDAMENTALLY CONFLICTS WITH THE HOLDINGS OF OTHER CIRCUITS

The circuit conflicts over the relevance and meaning of the *Frye* test, and over whether Rule 703 can be used as a "tool" to exclude expert testimony based on its particularized weight, are palpable from the analysis of the dissenting judges. *See* pp. 6-9, *supra*. The fundamental nature of these conflicts and the practical problems they generate underscore the need for this Court's prompt intervention.

A. *The Conflict Over the Common-Law "Frye Test"*

A number of circuits, over the course of more than a decade, have applied the old common-law *Frye* test, or some variant, independent of the statutory rules laid down by Congress. As the Fifth Circuit *en banc* majority recognizes, there is no claim here that Congress *adopted* the *Frye* test as one of its rules; rather, the claim is that it is proper to employ *Frye* "combined with" the Federal Rules of Evidence. A5.

Although no other circuit has engaged in the Fifth Circuit's massive expansion of the *Frye* test to cover the content of an expert's *reasoning* rather than just the legitimacy of novel scientific techniques (*see* pp. 7-8, *supra*), at least six other circuits have required district judges to conduct a *Frye* analysis of novel scientific techniques as a standard feature of making evidentiary determinations, explicitly refusing to rule that *Frye* has been supplanted by the Federal Rules of Evidence.[11]

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[11] The six circuits that have clearly insisted on the continued application of *Frye* despite the enactment of the Federal Rules of Evidence are:

Second Circuit: *United States v. McBride*, 786 F.2d 45, 49 (2d Cir. 1986) (holding that "[e]xpert testimony must be based upon a reliable area of expertise, as has come to be embodied in the rule associated with *Frye v. United States*, 293 F.2d 1013, 1014 (D.C. Cir. 1923)") (apparently rejecting criticism of *Frye* in *United States v. Williams*, 583 F.2d 1194 (2d Cir. 1978), *cert. denied*, 439 U.S. 1117 (1979), noted by dissenters, *see* A45 n.41).

Fourth Circuit: *Ellis v. International Platex, Inc.*, 745 F.2d 292, 304 & n.15 (4th Cir. 1984) (noting that "the *Frye* rule has come under increasing attack" and that the Circuit "has expressed concern," but has "continued to recognize its validity in certain circumstances"). *Cf. United States v. Smith*, 780 F.2d 1102, 1106 (4th Cir. 1985) (opining that "the adoption of the Federal Rules of Evidence [did not] change the existing law on the subject where not addressed"); *Werner v. Upjohn*, 628 F.2d 848, 856 (4th Cir. 1980), *cert. denied*, 449 U.S. 1080 (1981) ("in enacting the Federal Rules of Evidence Congress did not intend to wipe out the years of common law development in the field of evidence").

Sixth Circuit: *United States v. Metzger*, 778 F.2d 1195, 1203 (6th Cir. 1985), *cert. denied*, 477 U.S. 906 (1986) (stating that "[a]lthough '[a] number of the federal courts have responded to the enactment of Rule 702 by rejecting the *Frye* standard, [this circuit] still predicate[s] the admission of scientific evidence on general acceptance in the community'") (quoting academic commentary).

Seventh Circuit: *United States v. Smith*, 869 F.2d 348, 351 (7th Cir. 1989) (stating that "[a]lthough the validity of the judge-made rule in *Frye* has been criticized by some courts and commentators for numerous reasons, this circuit has continued to affirm (and to apply) the *Frye* standard").

Eighth Circuit: *United States v. Two Bulls*, 918 F.2d 56, 60 & n.7 (8th Cir. 1990) (refusing to reject use of *Frye* in evaluation of "the admissibility of any questionable opinion evidence," and commenting: "Many speculate that Rule 702 does supersede *Frye*. The government requests us to so rule. For the purposes of our discussion, we view the two rules as generally compatible and not as mutually exclusive").

The most vocal challenge to this view has been from the Third Circuit, which has consistently rejected use of *Frye* during the past six years. In *United States v. Downing*, 753 F.2d 1224, 1232-37 (3rd Cir. 1985) (prominently cited by the dissenters below, *see* A45 n.41), the Third Circuit surveyed the history of *Frye* and of the academic and judicial commentary. The *Downing* court summarized *Frye*'s "serious flaws," notably "its vagueness and its conservatism," and concluded that *Frye* "should be rejected as an independent controlling standard of admissibility" because it "reflects a conservative approach to the admissibility of scientific evidence that is at odds with the spirit, if not the precise language, of the Federal Rules of Evidence." *Id.* at 1236-37. The Third Circuit strongly reaffirmed its rejection of *Frye* last year, in *DeLuca v. Merrell Dow Pharmaceuticals, Inc.*, 911 F.2d 941, 955 (3d Cir. 1990), stating:

> We [explicitly rejected *Frye* in *Downing*], for among other reasons, because the general acceptance test was too vague and malleable to yield consistent results, and because its nose-counting emphasis often led to the exclusion of helpful evidence in contradiction to the spirit of the Federal Rules of Evidence.

Id. at 955.

When this Court, over the dissents of two Justices, declined in 1986 to review the status of *Frye*, *see United States v. Mustafa*, 22 M.J. 165 (C.M.A.), *cert. denied*, 479 U.S. 953 (1986) (White, J., joined by Brennan, J., noting need to resolve conflict in the circuits over "an obviously recurring and important issue"), there might have been good reason to expect that the Third Circuit's comprehensive and powerful *Downing* opinion, announced in 1985, would win acceptance in other circuits so as to avoid any need for this Court's review. This has not occurred, and there is no sign that it ever will. The six circuits that have continued to insist on using *Frye* -- all in opinions dated 1985 or later -- have noted the various criticisms, including those in *Downing*, but have refused to budge. *See* note 11, *supra*.

The refusal of these circuits and the Fifth Circuit *en banc* majority to recognize that the common-law *Frye* test is not part of

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D.C. Circuit: *United States v. Shorter*, 809 F.2d 54, 59-61 (D.C. Cir.), *cert. denied*, 484 U.S. 817 (1987) (reaffirming that "*Frye* is still the law of this Circuit").

current federal evidence law flatly violates this Court's requirements for statutory interpretation, including the interpretation of the Federal Rules of Evidence. As this Court has unanimously emphasized, "[b]ecause the Federal Rules of Evidence are a legislative enactment, we turn to the 'traditional tools of statutory construction,' in order to construe their provisions." *Beech Aircraft Corp. v. Rainey*, 488 U.S. 153, 163 (1988) (citation omitted). In one of the few lower federal court opinions to cite *Beech Aircraft* on this point and thereby heed the admonition that the Rules are a statute, then-Judge (now Justice) Thomas recently emphasized this fundamental guide to judicial decisionmaking. *United States v. Rogers*, 918 F.2d 207, 209 (D.C. Cir. 1990) (recognizing that on evidence questions a court must "begin as . . . with any statute, with the language of the rules themselves").

The plain language of the statute -- which the *en banc* majority refused to consider -- bars use of the common-law *Frye* test. Rule 401 defines "relevant evidence" as "evidence having *any* tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence." (Emphasis added.) Rule 402 states the broad policy of the Federal Rules of Evidence -- expansive admissibility -- and itemizes the only grounds for excluding evidence:

> All relevant evidence is admissible, except as otherwise provided [1] by the Constitution of the United States, [2] by Act of Congress, [3] by these rules or [4] by other rules prescribed by the Supreme Court pursuant to statutory authority. Evidence which is not relevant is not admissible.

(Brackets added).

The pre-1975 freedom of the federal appellate courts to create common-law evidence rules *ad hoc* is therefore gone. Congress specified the four grounds on which relevant evidence could be excluded, and neither *Frye* nor other common-law rules is listed. In exercise of its undoubted power to supplant judge-made procedure, *see* pp. 28-29 & n.17, *infra*, Congress has thus stripped the federal courts of authority to promulgate customized admissibility limits like those imposed by the court below.

The wording of Rule 402 is certainly no accident. A key objective of Congress in enacting the Rules was to bring *uniformity*

to federal evidence law. The Senate Report accompanying the bill that became the Federal Rules of Evidence cited the need for "a comprehensive code of evidence intended to govern the admissibility of proof in all trials before the Federal courts because of the lack of uniformity and clarity in the present law of evidence on the Federal level." S. Rep. No 93-1277, 93rd Cong., 2d Sess. (1974), at [1974] U.S. Code Cong. & Ad. News 7054. Rule 402 is "'the keystone to the whole scheme,'" designed both "to sweep away all pre-existing rules of exclusion" and "to modify this sweeping repeal by stating the relationship between the repealer and the pre-existing law as well as making clear that the rest of the Evidence Rules are exceptions to the basic rule of relevance." 22 Charles Alan Wright & Kenneth W. Graham, Jr., *Federal Practice and Procedure: Evidence* § 5192, at 177 (1978).[12]

Citing an opinion of then-Judge (now Justice) Kennedy handed down the year after enactment of the Federal Rules of Evidence, the Ninth Circuit in 1978 recognized (although only in dictum) that the "Rules supersede the rules of evidence based on common-law principles," and that "the courts are not free to establish rules of evidence independent of the Federal Rules." *United States v. Grajeda*, 570 F.2d 872, 874 (9th Cir. 1978), *withdrawn and new opinion issued on alternate ground*, 587 F.2d 1017 (9th Cir. 1978) (citing *United States v. Dixon*, 547 F.2d 1079, 1082 (9th Cir. 1976) (per Kennedy, J.)). This view was endorsed in a unanimous 1984 decision of this Court written by then-Justice (now Chief Justice) Rehnquist in *United States v. Abel*, 469 U.S. 45 (1984). Noting that "[b]efore the present Rules were promulgated, the admissibility of evidence in the federal courts was governed in part by statutes or Rules, and in part by case law," and briefly discussing Rule 402, the Court agreed with the view of Professor Cleary, Reporter for the Advisory Committee on the Rules, that: "'In principle, under the Federal Rules no common law of evidence remains.'" *Id.* at 50-52 (citation omitted).

[12] Although the language of Rule 402, which fails to list common-law judicial rules as a basis for exclusion, is really the end of the matter, it must be noted that Congress knew how to authorize use of common-law rules, and did just that in addressing the issue of evidence privileges. In Rule 501 Congress expressly permitted common-law development of privilege doctrine "in the light of reason and experience." It failed to do so with respect to other areas of the Rules, and there is no basis for implying such an intent where Congress was explicit elsewhere.

In the face of all of this, at least six circuits in addition to the Fifth continue to apply the common-law *Frye* rule. *See* note 11, *supra*. These circuits take no account of Rule 402 or of Congress's purposes in enacting the Rules. They assert, for example, that "in enacting the Federal Rules of Evidence Congress did not intend to wipe out the years of common law development in the field of evidence," *Werner v. Upjohn*, *supra*, 628 F.2d at 856, and indulge the presumption that "the adoption of the Federal Rules of Evidence [did not] change the existing law on the subject where not addressed," *United States v. Smith*, *supra*, 780 F.2d at 1106.

As this Court made clear in 1987, this type of argument is unacceptable: the lower federal courts may not insist on applying their own doctrines of evidence where the plain language of the Rules is to the contrary, on the excuse that Congress did not repeal specific common-law doctrines *by name*. In *Bourjaily v. United States*, 483 U.S. 173 (1987), this Court considered the status of the long-established common-law "bootstrapping rule" under the co-conspirator exception to the hearsay rule. The "bootstrapping rule" barred the hearsay statements *themselves* from being used to prove the conspiracy, and thereby trigger the exception, because "'otherwise hearsay would lift itself up by its own bootstraps to the level of competent evidence.'" *Id.* at 177 (citation omitted). Writing for the Court, Chief Justice Rehnquist noted Rule 104(a)'s provision that when deciding on the admissibility of evidence a trial court "is not bound by the rules of evidence except those with respect to privileges," and he stated that "[t]hat would seem to many to be the end of the matter. Congress has decided that courts may consider hearsay in making these factual determinations." *Id.* at 177-78.

Chief Justice Rehnquist then stated:

> But petitioner nevertheless argues that the bootstrapping rule, as most Courts of Appeals have construed it, survived this apparently unequivocal change in the law unscathed and that Rule 104, as applied to the admission of co-conspirator's statements, does not mean what it says. We disagree.
>
> Petitioner claims that Congress evidenced no desire to disturb the bootstrapping rule, which was embedded in the previous approach, and we should not find that Congress altered the rule without affirmative evidence so indicating. It would be extraordinary to require legislative history to *confirm*

the plain meaning of Rule 104.

Id. at 178 (emphasis in original).

Despite this Court's explicit rejection of the view that common-law rules of evidence somehow haunt the federal courthouses until Congress exorcises each one, incanting volume and page number, and despite this view's incompatibility with background separation-of-powers principles recognized by this Court, *see* pp. 28-29 & n.17, *infra*, the lower federal courts blithely apply *Frye* and other common-law rules as they wish. This is surely not out of ignorance: the Rules are easy enough to read, and the precedents of this Court are hardly obscure. The motivation of the *en banc* majority and the other circuits is clear enough. Professor Edward Imwinkelried, perhaps the leading commentator on the law of scientific evidence, explains the lower courts' disregard for Rule 402 and this Court's decisions in *Abel* and *Bourjaily* as follows:

> [The conception that] the judiciary has lost its common-law power to formulate exclusionary rules of evidence . . . understandably is unsettling to commentators and judges schooled in the common law of evidence. In this "Age of Statutes," some yearn -- almost nostalgically -- to return to the common law of yesteryear. Commentators have argued that particular common-law rules have survived the adoption of the Federal Rules, and courts have continued to enforce common-law restrictions on the admission of relevant evidence that are nowhere codified in the Federal Rules.

Imwinkelried, *The Meaning of Probative Value and Prejudice in Federal Rule of Evidence 403: Can Rule 403 Be Used to Resurrect the Common Law of Evidence?*, 41 Vand. L. Rev. 879, 883 (1988) (citations and footnotes omitted).

Although certiorari is clearly warranted if only to emphasize that lower courts must apply the Rules as written, and that federal common-law doctrines can no longer be used to exclude evidence, this case is particularly worthy of certiorari because the Fifth Circuit has managed to select the one common-law evidence rule *most* abusive of Congress's purposes in enacting the expert testimony provisions of the Rules -- countermanding a basic and obvious legislative policy choice.

As Judges Weinstein and Pratt have observed in careful historical essays on the subject, Congress enacted the expert testimony

provisions of the Federal Rules of Evidence *largely to get rid of common-law restrictions* on scientific testimony such as *Frye*, making a fundamental choice to allow the testimony of any knowledgeable expert having specialized information that might assist a jury -- and to rely upon the jury to assess the relative weight of testimony thrashed out in the adversary process. In doing so, Congress displaced the restrictive, distrustful approach to expert testimony developed over decades by the Federal Judiciary on a common-law basis. Under these rules, for example, an expert was often forced to testify through use of hypothetical questions, thereby limiting the bases of the expert testimony to otherwise admissible evidence; usually an expert could not opine on an "ultimate issue" for fear of invading the province of the jury; and the *Frye* "general acceptance" limit was typically imposed on an expert's techniques, incorporating a method of peer review for underlying scientific theories.

Such common-law restrictions endured decades of criticism from courts and commentators alike. As Judge Weinstein has noted, their approach "in practice was often stilted, awkward and unduly restrictive." Weinstein, *Improving Expert Testimony*, 20 U. Rich. L. Rev. 473, 476 (1986). "As technology advanced and expert testimony became more important in the resolution of increasingly complex litigation, unnecessary impediments became unacceptable," and in particular, "it became clear that the *Frye* rule might block the introduction of important and useful testimony." *Id.* at 476-77.

Passage of the Federal Rules of Evidence revolutionized expert testimony. "With little discussion, Congress adopted the opinion rules in nearly the same form as the advisory committee proposed," which "is perhaps understandable since the rules reflect an enlightened, academic view of opinion testimony that dates back some fifty years." Pratt, *A Judicial Perspective on Opinion Evidence Under the Federal Rules*, 39 Wash. & Lee L. Rev. 313, 314 & n.5 (1982) (citing authorities). The scheme "rel[ies] heavily on the adversary system," and trusts the ability of counsel to present such testimony and of juries to evaluate it. *Id.* at 313. The goal "[t]hat evidence scholars had long been seeking ha[s] now come to pass." Weinstein, *supra*, at 477.

The wisdom of this policy choice, to be sure, is open to debate, as evidenced by the recent controversy over the perceived problem of "junk science" in the federal and state court systems -- best

illustrated by Peter Huber's new book on the subject. Yet even Huber, perhaps the leading critic of current evidence rules, confirms that *Frye* was the type of restrictive, judge-made test that the Rules were designed to supplant.[13] The history underlying the adoption of the Rules could hardly be more hostile to *Frye*. The *en banc* majority's ignorance of this background -- despite specific briefing the history of the expert testimony rules and on the plain meaning of Rule 402 -- evinces a Rip-Van-Winkle-like tone that would be puzzling if the motivation could not so easily be read between the lines.

Because the *en banc* majority perpetuates a misunderstanding of the very nature of the Federal Rules of Evidence, the need for this Court's prompt intervention on the *Frye* issue alone is clear.

B. *The Conflict Over the Meaning of Fed. R. Evid. 703*

Although the *en banc* majority recognized that the two straightforward sentences of Rule 703 concern only whether the facts or data an expert is using are *admissible*, and that the Rule's purpose was to permit experts to rely on hearsay and other inadmissible sources, it felt compelled to go beyond the text. It instructed trial judges to weigh the "sufficiency and accuracy of underlying facts as they relate to the case at hand" so that Rule 703 would not be "impotent as a tool for testing the trustworthiness" of the testimony, whether or not the facts or data are admissible. A13; *see also* pp. 5-6, *supra*. This abrupt departure from the text of Rule 703 is an

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[13] As Huber's critical history of *Frye* relates:

> *Frye* held sway until the 1970s, when it collided with the high ambition of the Calabresians" [seeking expanded tort liability]. Viewed from any angle, *Frye* clearly threatened to cut short the great Calabresian search for cheap, wide-ranging control.
>
> Lawyers couldn't change what mainstream science maintained, but they could decide whether mainstream science mattered. That is exactly what they did. . . . When the Federal Rules of Evidence were first codified in 1975, they made no mention of *Frye* whatsoever. Expert testimony would be allowed, thenceforth, '[i]f scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact.' Mainstream scientific consensus didn't matter any more.

P. Huber, *Galileo's Revenge: Junk Science in the Courtroom* 15-16 (1991) (quoting Rule 702).

insupportable judicial amendment of a statute in an attempt to reinstate the common-law supervision of expert testimony that the Rules were designed to supplant.

Chief Judge Clark's analysis of Rule 703's text and purpose, *see* A17-A23, is accepted by most circuits which have specifically addressed the theory adopted by the *en banc* majority. At least seven circuits have emphasized that Rule 703 is a specialized hearsay exception allowing experts to function in court as they do in life, when referring to given "types" of information on general "subjects," rather than a "tool" for courts to deploy in order to scrutinize the weight or detail of *particular* opinions relying on *particular* facts and data. The whole point of the Rule is to modify courtroom procedures to accommodate the customary practice of experts. There is simply no way of reading the Rule to accomplish the Fifth Circuit's aim: to provide trial judges with a device for excluding expert opinions they deem unfounded.

Consistent with this analysis, the Ninth Circuit (through a panel including Judge Kozinski) has termed Rule 703 "the expert testimony exception to the hearsay rules." *United States v. Unruh*, 855 F.2d 1363, 1376 (9th Cir. 1988), *cert. denied sub nom. Forde v. United States*, 488 U.S. 974 (1988). As Judge Rymer explained this year, under Rule 703 "an expert opinion may be based on any type of evidence commonly used by experts in the field." *Rogers v. Raymark Industries, Inc.*, 922 F.2d 1426, 1429-30 (9th Cir. 1991). And, as the Sixth Circuit summarized in an influential early opinion:

> The purpose of Rule 703 is to make available to the expert all of the kinds of things that an expert would normally rely upon in forming an opinion, without requiring that these be admissible in evidence. Under the Rule, the expert is free to give his opinion relying upon the types of data an expert would normally use in forming an opinion in his area of expertise. In short, through Rule 703, the law is catching up with the realities of professional life.

Mannino v. International Manufacturing Co., 650 F.2d 846, 851 (6th Cir. 1981). *See also Kingsley Associates, Inc. v. Del-Met, Inc.*, 918 F.2d 1277, 1286-87 (6th Cir. 1990) (reaffirming *Mannino* and elaborating further).

In addition to the Sixth and Ninth Circuits, other circuits rejecting

the Fifth Circuit's construction of Rule 703 are the First, Fourth, Seventh and Eighth.[14]

Undoubtedly the sharpest conflict under Rule 703, however, is that between the Fifth Circuit and the Third Circuit, whose Rule 703 opinions petitioners and their *amicus* urged the Fifth Circuit to heed, and which the dissenters cited. A35-A36 & n.10. The Third Circuit has *three times* (twice in toxic tort cases) squelched attempts of trial judges to use Rule 703 to exclude the opinions of experts based on their perceived lack of weight in exactly the manner championed by the Fifth Circuit below. The conflict between the Third and Fifth Circuits could not be deeper or more significant.

• In perhaps the most widely noted Rule 703 decision, *In Re Japanese Electronic Products Antitrust Litigation*, 723 F.2d 238 (3rd Cir. 1983), *rev'd on other grounds sub nom. Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574 (1986), the district

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[14] **First Circuit:** *International Adhesive Coating Co., Inc. v. Bolton Emerson Intn'l*, 851 F.2d 540, 544 (1st Cir. 1988) ("As noted in Rule 703, such reasonableness is measured against the facts or data upon which experts in the particular field normally rely"); *id.* at 545 ("When the factual underpinning of an expert's opinion is weak, it is a matter affecting the weight and credibility of the testimony – a question to be resolved by the jury").

Fourth Circuit: *Clinchfield Railroad Co. v. Lynch*, 784 F.2d 545, 553-544 (4th Cir. 1986) (stating that under Rule 703, upon a showing that facts or data are "regularly relied upon" by experts in the field, questions going to weight should be "'attacked by cross examination and refutation'"); *Wilder Enterprises, Inc. v. Allied Artists Pictures Corp.*, 632 F.2d 1135, 1144 (4th Cir. 1980) (holding that after threshold Rule 703 showing is met, "[t]he asserted fallibility of the expert's assumptions affected the weight of his testimony, not its admissibility").

Seventh Circuit: *United States v. Lundy*, 809 F.2d 392, 395-96 (7th Cir. 1987) (stating that "hearsay and third-party observations that are of a type normally relied upon by an expert in the field are properly utilized by such an expert in developing an expert opinion"); *First National Bank of Kenosha v. United States*, 763 F.2d 891, 895 (7th Cir. 1985) (noting that Rule 703 "was intended to obviate objections to expert testimony based on the inadmissibility of the data upon which that opinion was based").

Eighth Circuit: *United States v. Kail*, 804 F.2d 441, 447 (8th Cir. 1986) (observing that second sentence of Rule 703 did not apply because "[t]he opinions in this case were based on admissible evidence"); *Cashman v. Allied Products Corp.*, 761 F.2d 1250, 1255 (8th Cir. 1985) (noting that objection that expert testimony is based on false assumptions goes "to the weight of this evidence rather than to its admissibility").

judge refused to admit into evidence expert antitrust reports or live opinions about them, despite uncontradicted affidavits establishing that the data in those reports were reasonably relied upon by experts in the relevant fields. The judge proceeded on the notion that, under Rule 703, "given the potential for open-ended receipt into evidence of testimony based upon information of questionable reliability, it is plain that some limitation on the types of information upon which an expert may rely is essential," and that "the judge must be the ultimate arbiter of the reliability of materials upon which an expert witness bases his opinion," *Zenith Radio Corp. v. Matsushita Elec. Indus. Co.*, 505 F. Supp. 1313, 1323, 1326 (E.D. Pa. 1980). This was exactly the sentiment of the *en banc* majority below, which worried that reading Rule 703 to mean what it says "often will render Rule 703 impotent as a tool for testing the trustworthiness of the facts and data" and which stated that "[d]istrict judges may reject opinions founded on critical facts that are plainly untrustworthy." A13.

The Third Circuit flatly rejected this reasoning. It found that the district judge made "a fundamental legal error" by "assum[ing] that the determining factor under Rule 703 was *his* view of what data experts in a field *ought* to rely upon rather than making a factual inquiry and a finding as to what data experts . . . deem reliable." 723 F.2d at 281 (emphasis added). After a thorough review of the language and history of the provision, the Third Circuit stated that the roots of Rule 703 run too deep to leave room for such policy adjustments by the courts:

> What the trial court did in effect was to reject the decision of the Judicial Conference, the Supreme Court, and Congress and adhere to an unusually restrictive view as to the basis on which an expert's opinion may be laid.

Id. at 277 (citation omitted). Instead, the Third Circuit encouraged vigorous cross-examination of experts, noting that "the factfinder can be expected to determine the appropriate weight to be given to the testimony." *Id.* at 277-78.

• Next, in *DeLuca v. Merrell Dow Pharmaceuticals, Inc.*, 911 F.2d 941 (3d Cir. 1990), the Third Circuit confronted a district judge who used Rule 703 in a toxic tort case to rule out all of plaintiffs' expert testimony solely because it was against "the

great weight of scientific opinion," *id.* at 944, and particularly because plaintiffs' experts had not produced published, "statistically significant" studies proving causation with 95% certainty, *id.* at 945-49 -- precisely what the district judge ruled in this case. A71, A73-A74. Strongly reaffirming its *Japanese Electronics* ruling, the Third Circuit stressed that "Rule 703 was designed to broaden and liberalize the permissible bases for expert testimony," *id.* at 952-53, and stated:

> [W]e do not view the absence of statistically significant findings or the great weight of contrary opinion as being relevant to the Rule 703 question posed here. Rule 703 is satisfied once there is a showing that an expert's testimony is based on the *type of data* a reasonable expert in the field would use in rendering an opinion on the subject at issue; it does not address the reliability or general acceptance of an expert's *methodology*.

Id. at 953 (emphasis added).

To ensure that the district court on remand would actually apply Rule 703 in the manner Congress intended, the Third Circuit warned it to be "sensitive to the relevant policy judgments reflected in the Federal Rules of Evidence . . . [which] embody a strong and undeniable preference for admitting any evidence having some potential for assisting the trier of fact and for dealing with the risk of error through the adversary process. *Barefoot v. Estelle*, 463 U.S. 880, 899 & 901 n.7 (1983)." *Id.* at 956. Voicing the same concerns about a contrary course that the *en banc* dissenters below raised, the Third Circuit recognized that "we do not have the authority to create special rules to address the problems raised" by toxic tort litigation"; that "we may not manipulate our interpretation" of the Rules to accomplish that end; and that "we [are not] at liberty, especially in a case to be decided under our diversity jurisdiction, to impose different burdens of proof" on toxic tort plaintiffs than on other plaintiffs. *Id.* at 952.

• The Third Circuit recently rebuffed yet another attempt to use Rule 703 as a "tool" for excluding expert testimony in *In re Paoli Railroad Yard PCB Litigation*, 916 F.2d 829 (3d Cir. 1990), *cert. denied sub. nom. General Electric Co. v. Knight*, 111 S. Ct. 1584 (1991). In this toxic tort case, the district judge had barred testimony from plaintiffs' experts because it relied in part on animal studies and, he said, "'we have very convincing evidence on the record [from defendants' experts] that says these studies are irrelevant.'" *Id.* at 846 (quoting district court opinion). The Third Circuit overturned this ruling, invoking *Japanese Electronics* and *DeLuca*. *Id.* at 853-55.

Given the Third Circuit's repeated rejections of exactly the theory embraced below by the district court and the *en banc* Fifth Circuit majority, and its embrace of the analysis of the Fifth Circuit dissenters, there can be no doubt about the deep circuit conflict in this case. Under the Third Circuit's analysis of Rule 703, petitioners' expert testimony would not have been excluded; under the Fifth Circuit's rewrite of Rule 703, it was.

The Fifth Circuit is not the first to misinterpret Rule 703. At least two other circuits have endorsed using Rule 703 as a "tool" in a manner similar to the Fifth Circuit's -- the Second Circuit and the Tenth.[15] There is thus a clear and persistent circuit conflict over the construction of Rule 703 -- a rule relevant to virtually every federal trial involving expert testimony. This Court should not permit this circuit split to fester or the Fifth Circuit's error to be perpetuated by other lower federal courts.

C. *The Need for This Court Promptly to Resolve These Conflicts and to Provide Guidance on Expert Testimony Generally*

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[15] **Second:** *Shatkin v. McDonnell Douglas Corp.*, 727 F.2d 202, 208 (2d Cir. 1984) (relying on district court decision in *Japanese Electronics*, holding that district court had "the discretionary right under Fed.R.Evid. 703 to determine whether the expert acted reasonably in making assumptions of fact upon which he would base his testimony" and stating that excluded testimony "would probably have hopelessly confused and misled the jury because of the latter's inability to appraise the extremely questionable and unsupported assumptions underlying the testimony").

Tenth: *Head v. Lithonia Corp.*, 881 F.2d 941, 943 (10th Cir. 1989) (relying on Fifth Circuit case and holding that Rule 703 "provides a mechanism by which the court can evaluate the trustworthiness of the underlying data on which the expert relies").

Ever since the Fifth Circuit granted *en banc* review in this case more than a year ago, and particularly after the *en banc* decision was announced, this case has been closely watched and analyzed by the bar and the media.[16] The *per curiam* opinion of a lopsided *en banc* majority of an influential circuit, encouraging trial judges to fashion new common-law "tools" for excluding expert testimony, is likely to influence litigation nationwide. So would, unavoidably, a decision by this Court to deny review.

This conflict over expert testimony, with its profound impact on the ultimate outcomes of civil and criminal cases in federal courtrooms nationwide, will not go away. Inter-circuit disputes have sharpened, positions have hardened, and grounds for reconciliation have disappeared. No case could present more squarely and starkly than this one the essential differences of opinion among powerful lower-court judges. Waiting another Term or longer would serve no purpose; acting now could prevent massive and wasteful litigation and ensure proper judicial treatment of thousands of claims.

The irony is that, as the legislative history makes plain, one of Congress's fundamental goals in enacting the Federal Rules of Evidence was to obtain uniformity in federal court evidentiary standards. *See* p. 16, *supra* (quoting Senate report). Despite the adoption of the Federal Rules, the circuits have now set radically divergent evidence standards; only this Court can vindicate the core congressional goal of uniformity.

A second basic policy choice of Congress also needs to be rescued: the clear dictate of Fed. R. Evid. 402 that all relevant evidence "*is admissible, except* as otherwise provided [1] by the Constitution of the United States, [2] by Act of Congress, [3] by these rules or [4] by other rules prescribed by the Supreme Court pursuant to statutory authority" (emphasis and brackets added). In spite of Rule 402 and in spite of the fact that the Federal Rules constitute *a statute*, the *en banc* Fifth Circuit has now expressly reaffirmed what it and other Circuits have previously

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[16] *See, e.g.*, "Fifth Circuit Formulates Stiff Test For Admitting Toxic Tort Expert Opinion," 60 U.S.L.W. 1042 (Sept. 17, 1991); Taylor, "Expert Witness Opinion Eyes; Circuits Split on the Issue," *National Law Journal*, Oct. 21, 1991, at 3.

held: a common-law doctrine such as *Frye* -- expressly invoked as an independent principle of law, *not* as an interpretation of the Federal Rules or any component thereof -- remains by itself a lawful ground for exclusion of otherwise admissible evidence. This fundamental misconception must be corrected, lest not only *Frye* be perpetuated, but also new common-law rules follow, allowing the carefully and deliberately crafted congressional evidence scheme to become a mere canvass on which each federal judge is allowed to paint in accord with his or her own litigation tastes.

Despite the sharpening of disputes over these evidence issues between, most notably, the Fifth and Third Circuits, some circuits remain up for grabs. Now that the well-respected Fifth Circuit has acted *en banc*, rejecting detailed dissents, trial judges in other circuits across the country may follow -- seeking safety in what is, essentially, the most authoritative judicial pronouncement since the adoption of the Federal Rules of Evidence on expert testimony and on the perpetuation of common-law evidence rules. To the extent the Fifth Circuit and its compatriots are followed, ever more cases will be wrongly decided at the trial level, thus creating excessive appeals. By acting now, this Court can stem the tide and restore order.

Given the sharp circuit conflict and the fact that, as the dissenters noted, A51-A52, the Fifth Circuit's approach threatens to usurp substantive rights under state law, this Court's failure to act at this point can only encourage rampant forum-shopping. Parties will seek to remove cases filed in state court to sympathetic federal circuits. Federal litigants, recognizing that evidence rules now determine the ultimate outcome of their cases, will lobby one jurisdiction or another to accept nationwide consolidation of mass tort claims. Claims will be determined not on their actual merits but on the ability of lawyers to maneuver them into courts with friendly evidence rules. None of these trends will ease the burden on the federal courts or encourage efficient and fair resolution of cases.

Last Term this Court found it appropriate to resolve a circuit split over the question whether knowing receipt of altered automobile titles that reflect odometer rollbacks violates the

federal anti-counterfeiting criminal statute, "[n]otwithstanding the narrowness of the issue." *Moskal v. United States*, 111 S.Ct. 461, 464 (1990). This Court acted after only three circuits had expressed a view. The circuit split presented by this case is surely more wide-ranging and at least as important; although this case arises in a civil context, it concerns federal rules equally applicable to criminal cases, and it will clearly affect countless civil and criminal litigants in the years ahead.

II. THE *EN BANC* COURT'S HOLDING CONFLICTS WITH CORE CONSTITUTIONAL PRINCIPLES

As the above elaboration of the circuit conflicts has already suggested, and as the *en banc* Fifth Circuit dissenters emphasized, the issues surfaced by this case go to the very heart of our constitutional structure. The Fifth Circuit's attempt to revive the old common-law regime of discretionary control over expert testimony, in the form of a resurrected *Frye* doctrine and a judicial hijacking of Rule 703, not only poses conflicts over the meaning of particular statutory provisions, but raises constitutional concerns of the first order. These involve three fundamental doctrines meant to keep the power of the Judiciary within bounds.

First is this Court's respect for Congress's core power under the Necessary and Proper Clause "to enact laws carrying into execution the powers vested in other departments of the Federal Government," *Kaiser Aetna v. United States*, 444 U.S. 164, 172 n.7 (1979), including Congress's "undoubted power to regulate the practice and procedure of federal courts." *Sibbach v. Wilson & Co.*, 312 U.S. 1, 9 (1941). The power of federal courts -- including *this* Court -- "to prescribe rules of procedure and evidence for the federal courts exists only in the absence of a relevant Act of Congress." *Palermo v. United States*, 360 U.S. 343, 353 n.11 (1959).

Here Congress has announced its *own* rules of evidence, but the *en banc* Fifth Circuit has turned a deaf ear to this pronouncement. It has chosen to advance its own concerns about appropriate evidence policy by brazenly enacting a 1991 "pocket part" to

the Federal Rules of Evidence to govern the Fifth Circuit, and denying Congress the last word.[17] The Fifth Circuit's attempt to function, to borrow an apt phrase, as "a sort of junior-varsity Congress," *Mistretta v. United States*, 488 U.S. 361, 427 (1988) (Scalia, J., dissenting), should be overturned.

Second, the Fifth Circuit's decision to use the accident of its diversity jurisdiction to impose on the citizens of Texas that Circuit's own common-law *Frye* rule strikes at the heart of the doctrine of *Erie Railroad v. Tompkins*, 304 U.S. 64 (1938), for it has the effect, as the Fifth Circuit dissenters explained, of destroying the substance of Texas law in toxic tort cases. *See* p. 8 & n.9, *supra*. The Fifth Circuit's tortured construction of Rule 703 likewise invades principles of federalism articulated by this Court. Had the *en banc* majority addressed this issue by labeling its ruling "procedural" and invoking *Hanna v. Plumer*, 380 U.S. 460 (1965), the effort would have failed. For Rule 703 was not promulgated under the Rules Enabling Act, and thus does not carry *Hanna*'s presumption that Congress impliedly authorized such displacements of state law as that Rule might necessitate. Rule 703 is *an independent federal statute*, and before adopting a construction of Rule 703 so invasive of core State concerns the Fifth Circuit was obliged to show that Congress made a "plain statement" that it wished Rule 703 to be employed in this manner. *See Gregory v. Ashcroft*, 111 S. Ct. 2395, 1399-1401 (1991). No such showing was (or could be) made.

Third and finally, the Fifth Circuit's decision removes one of the Constitution's most basic checks on judicial power -- the check provided by the jury system. Under the Seventh Amend-

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[17] Congress is entitled to that last word. Quite apart from the text of Rule 402, this Court employs a presumption that relevant legislation displaces judge-made rules, a presumption which was not honored by the Fifth Circuit. Congress overrides federal judge-made law by comprehensively addressing a particular matter -- here, admissibility of expert testimony -- and *failing* to preserve such judge-made law. *Milwaukee v. Illinois*, 451 U.S. 304, 315 (1981) (citation omitted). As this Court has explained, "Our 'commitment to the separation of powers is too fundamental' to continue to rely on federal common law 'by judicially decreeing what accords with "common sense and the public weal"' when Congress has addressed the problem." *Ibid.* (citations omitted).

ment, both plaintiffs and defendants are entitled to have a *jury* resolve disputed issues of historical and scientific fact. "Credibility determinations, the weighing of the evidence, and the drawing of legitimate inferences from the facts are jury functions, not those of the judge." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255 (1986). The Fifth Circuit's *en banc* decision works a complete takeover of these essential functions in cases turning on expert scientific testimony and thereby plainly violates the Seventh Amendment, for it has no conceivable analogue in procedural law circa 1791. *Parklane Hosiery Co. v. Shore*, 439 U.S. 322, 336-37 (1979). The Seventh Amendment's history makes clear that its central mission is to prevent just such a takeover and thus to check the power of autocratic, life-tenured federal judges by entrusting factual disputes to people *other* than the sovereign's judges, however inefficient this can at times be. *See id.* at 337-56 (Rehnquist, J., dissenting); *see also Granfinanciera, S.A. v. Nordberg*, 492 U.S. 33, 83 (1989) (White, J., dissenting) ("'The function of the civil jury is to diffuse the otherwise autocratic power and authority of the judge'").

This Court has rejected arguments "founded on the premise that a jury will not be able to separate the wheat from the chaff," and this Court does "not share [such a] low evaluation of the adversary process." *Barefoot v. Estelle*, 463 U.S. 880, 901 n.7 (1983) (per White, J.). But whether this Court is right, or whether the Fifth Circuit is instead correct in its "intellectual elitism," A54, the Seventh Amendment bars the Fifth Circuit's experiment in stripping juries of their fact-finding power.

CONCLUSION

For all these reasons, certiorari should be granted.

Respectfully submitted,

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November 7, 1991

APPENDICES

APPENDIX A

En banc decision of the United States Court of Appeals for the Fifth Circuit, affirming the district court's grant of summary judgment for respondents, dated August 15, 1991 . . . . . A1

APPENDIX B

Original panel opinion of the United States Court of Appeals for the Fifth Circuit, reversing the district court's grant of summary judgment for respondents and remanding, dated June 4, 1990 . . . . . A56

APPENDIX C

Order of the United States District Court for the Western District of Texas, granting summary judgment for respondents, dated October 12, 1989 . . . . . A66

APPENDIX A

UNITED STATES COURT OF APPEALS
For the Fifth Circuit

No. 89-1995

ROSEMARIE CHRISTOPHERSEN
Surviving Spouse of Albert Roy
Christophersen, Deceased, and
STEVEN ROY CHRISTOPHERSEN,

Plaintiffs-Appellants,

VERSUS

ALLIED-SIGNAL CORPORATION,
INC., ALLOYS INTERNATIONAL, INC.,
UNITED CATALYSTS, INC.,
THE HALL CHEMICAL COMPANY,
MARATHON MANUFACTURING COMPANY, and
CP CHEMICALS, INC.,

Defendants-Appellees.

Appeal from the United States District Court
For the Western District of Texas

(August 15, 1991)

Before CLARK, Chief Judge, REAVLEY, KING, JOHNSON, GARWOOD, JOLLY, HIGGINBOTHAM, DAVIS, JONES, SMITH, DUHE, WIENER and BARKSDALE, Circuit Judges.*

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* Judge Emilio M. Garza was not a member of the court when this case was submitted to the court *en banc* and did not participate in this decision.

PER CURIAM:

The issue presented by this appeal is how a court should determine the admissibility of expert opinion testimony. At the summary judgment stage of this case, plaintiff attempted to establish medical causation of a toxic tort through the testimony of a single expert witness. The district court held that the basis of the expert's opinion was insufficiently reliable and, in the alternative, that the expert's testimony would have been more prejudicial than probative. With the expert's testimony ruled inadmissible, plaintiff was left without proof of causation. The district court entered summary judgment for the defendants. We affirm.

I.

Christophersen died in March of 1986 as a result of a rare, small-cell form of cancer that originated in his colon and metastasized to his liver. During the fourteen years preceding his death, Christophersen worked for Marathon at its plant in Waco, Texas. At that plant, Marathon produces nickel/cadmium batteries. Christophersen never was directly involved in the production of these batteries. The record, however, indicates that over a number of years Christophersen's job duties required him to visit the area of the plant in which the batteries were manufactured. During these visits, Christophersen was allegedly exposed to fumes resulting from the manufacturing process. Plaintiffs, Christophersen's surviving spouse and child, contend that these fumes contained particles of nickel and cadmium and that Christophersen's exposure to these heavy metals caused the cancer that resulted in his death.

Plaintiffs brought suit pursuant to the Texas Wrongful Death and Survival Statute, Tex.Civ.Prac. & Rem.Code Ann. §§ 71.001.031 (Vernon 1986), against Marathon and a number of companies that supplied Marathon with chemicals and other materials used in the manufacture of the nickel/cadmium batteries. Plaintiffs' complaint alleged that the products used in the production of the batteries were defectively designed, manufactured, and marketed, and were the producing causes of the cancer that resulted in Christophersen's death. The complaint also alleged that Marathon was aware of the dangerous nature of the chemicals and products and failed to

provide Christophersen a safe place to work or to warn him of the dangerous conditions that existed at the plant. Marathon moved for summary judgment. The district court determined that plaintiffs failed to state a design defect or manufacturing defect claim and granted the defendants' motions for summary judgment. Plaintiffs do not appeal this ruling.

The district court also granted Marathon's motion for summary judgment on the marketing defect claim because the plaintiffs did not present sufficient evidence of causation. In reaching this conclusion, the court focused on the affidavit of the plaintiffs' expert witness, Dr. Miller, who concluded that Christophersen's exposure to nickel and cadmium at Marathon caused the cancer that resulted in his death. The district court undertook an in-depth review of the basis for Dr. Miller's conclusion and determined that his opinion should be excluded. On appeal, a panel of this court reversed, holding that Dr. Miller's opinion was not so fundamentally unreliable that the jury should not consider it. Defendants timely petitioned this court for rehearing *en banc*.

II.

A trial court's ruling regarding admissibility of expert testimony is protected by an ambit of discretion and must be sustained unless manifestly erroneous.[1] At the same time, we accord "proper deference to the jury's role as the arbiter of disputes between conflicting opinions. As a general rule, questions relating to the bases and sources of an expert's opinion affect the weight to be assigned that opinion rather than its admissibility and should be left for the jury's consideration." *Viterbo v. Dow Chem.*, 826 F.2d 420, 422 (5th Cir. 1987); *see also Dixon v. International Harvester*, 754 F.2d 573, 580 (5th Cir. 1985).

This is an appeal from a grant of summary judgment. Although

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[1] *See, e.g., Salem v. United States Lines Co.*, 370 U.S. 31, 35, 82 S.Ct. 1119, 1122, 8 L.Ed.2d 313 (1962); *Spring Co. v. Edgar*, 99 U.S. 645, 658, 25 L.Ed. 487 (1878); *Myers v. Griffin-Alexander Drilling Co.*, 910 F.2d 1252, 1254 (5th Cir. 1990); *Washington v. Armstrong World Indus.*, 839 F.2d 1121, 1123 (5th Cir. 1988); *Viterbo v. Dow Chem.*, 826 F.2d 420, 422 (5th Cir. 1987); *Crawford v. North*, 447 F.2d 738, 740-41 (5th Cir. 1971).

we review grants of summary judgment *de novo*, that is, under the same Rule 56 standards as are used by the district court, *e.g.*, *Medlin v. Palmer*, 874 F.2d 1085, 1089 (5th Cir. 1989) (applying the *Celotex* and Rule 56 summary judgment standards de novo) (citing *United States Steel Corp. v. Darby*, 516 F.2d 961 (5th Cir. 1975)), in Rule 56 proceedings we still apply the manifest-error standard of review to the trial court's evidentiary rulings, *Lavespere v. Niagara Mach. & Tool Works*, 910 F.2d 167, 175-76 (5th Cir. 1990); *Slaughter v. Southern Talc Co.*, 919 F.2d 304, 306-07 (5th Cir. 1990); *Washington v. Armstrong World Indus.*, 839 F.2d 1121, 1123 (5th Cir. 1988); *Viterbo*, 826 F.2d at 422.[2] Thus an appeal of a summary judgment presenting evidentiary issues raises two levels of inquiry. At the first level, we review the trial court's evidentiary rulings, which define the summary judgment record, and we give these rulings their due deference. At the second level, with the record defined, we review the trial court's summary judgment decision *de novo*. When the contested evidence is essential to the cause of action and the trial court has excluded the evidence, we may decide the appeal at the first level solely on the basis of the soundness of the evidentiary ruling. For if we uphold the exclusion of essential evidence, the second-level inquiry becomes academic. *E.g.*, *Viterbo*, 826 F.2d at 422 (stating that appropriateness of summary judgment depends solely upon whether the district court erred in excluding causation testimony of plaintiff's expert). This is such a case. Without Dr. Miller's testimony, Christophersen cannot prove that any exposure to nickel/cadmium caused the colon cancer. In sum, we ask in this appeal whether excluding Dr. Miller's opinion was manifestly erroneous.

[2] For the proposition that materials relied upon at a summary judgment hearing must contain only information that is admissible at trial, *see generally* Fed.R.Civ.P. 56(e) (discussing affidavits); C. Wright, A. Miller, & M. Kane, *10A Fed.Prac. & Proc.* § 2722 at 48-50 & n. 12 (depositions), § 2738 at 470 & n. 7, 474 & n. 12 (affidavits) (2d ed. 1983). *Cf. Liberty Leasing Co. v. Hillsum Sales Corp.*, 380 F.2d 1013, 1015 (5th Cir. 1967) (upholding district court's decision to disregard deposition that contained inadmissible hearsay), cited in *Samuels v. Doctors Hosp. Inc.*, 588 F.2d 485, 487 (5th Cir. 1979).

III.

The Federal Rules of Evidence, combined with *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923), provide a framework for trial judges struggling with proffered expert testimony. The signals are not neatly cabined categories, and we disentangle them only to accent the independent significance of each.

(1) whether the witness is qualified to express an expert opinion, Fed.R.Evid. 702;
(2) whether the facts upon which the expert relies are the same type as are relied upon by other experts in the field, Fed.R.Evid. 703;
(3) whether in reaching his conclusion the expert used a well-founded methodology, *Frye*; and
(4) assuming the expert's testimony has passed Rules 702 and 703, and the *Frye* test, whether under Fed.R.Evid. 403 the testimony's potential for unfair prejudice substantially outweighs its probative value.

These four signals or inquiries introduce no new concepts to our jurisprudence. They are only guideposts drawn from the Federal Rules of Evidence and our cases. We list these inquiries, but in doing so we do not intend that they be applied mechanically. At the same time, they often will naturally lend themselves to sequential application. The reality is that trials are too varied for fixed molds; we construct none today.

The first three steps are best understood as threshold requirements that all expert testimony must meet before being deemed admissible. *Cf. Gideon v. Johns-Manville Sales Corp.*, 761 F.2d 1129, 1135 (5th Cir. 1985) (construing Rule 702's qualifications requirement as a threshold inquiry); *Slaughter*, 919 F.2d at 306-07 (construing Rule 703's factual basis requirement as a threshold inquiry). Rule 403, on the other hand, provides an overlay -- a final mechanism for screening out otherwise admissible testimony whose potential for prejudice substantially outweighs its probative value.[3] *Cf.* 22 C. Wright & K. Graham, *Federal Practice &*

[3] Of course, Rule 402's requirement that, to be admissible, all evidence must be relevant applies with the same force to expert testimony as it does to all forms of evidence.

Procedure, § 5213 at 258-59 (1978).

The first question concerns the expert's qualifications: Is the witness -- because of his specialized knowledge, skill, experience, training, or education in the relevant field -- qualified to express an expert opinion on the topic at issue? Fed.R.Evid. 702. The Advisory Committee Note accompanying Rule 702 reads the broad language of the rule to permit expert testimony not only by experts carrying formal credentials such as university degrees and professional memberships but also by so-called skilled witnesses, whose experiences permit them to testify with authority on a given topic. The areas of inquiry that expert testimony may address are similarly broad, including scientific and technical questions as well as any other area of specialized knowledge. An expert may testify in his area of expertise "in the form of an opinion or otherwise." This much is rote. The more subtle problem, and our caveat, is that the inquiry into the qualifications of an expert should not be a substitute for scrutinizing an expert's reasoning or methodology. At this stage, the only question for the trial court is whether the expert is generally qualified to render an opinion on the question in issue.

Second, if the expert is qualified, are the facts and data that serve as a basis for the expert's opinion the same type of facts as other experts in the same field reasonably rely upon in forming their opinions? Fed.R.Evid. 703.[4] While testimony based on the personal observations of the expert is preferable, neither the rules nor our cases have insisted on personal examinations.[5] The reports and statements of others such as doctors, nurses, or medical personnel, while not as valuable as testimony based on the expert's own observations, can provide a reliable basis for the expert's opinion, at least when reliance on such sources is the custom of the discipline. At the same time, a common-sense skepticism may be warranted when an expert's factual basis is derived, not from treatment or observation, but from subjective information obtained from counsel or client in preparation for trial.[6] But such skepticism should not necessarily lead us to exclude the expert's opinion. So

[4] Note that for purposes of Rule 703 this question is applicable only if the facts and data relied upon are not independently admissible. Fed.R.Evid. 703.

[5] *Washington*, 839 F.2d 1121.

[6] *Viterbo*, 826 F.2d at 423.

long as the facts upon which the expert bases his opinion are those "perceived or made known to the expert at or before the hearing" and are "of a type reasonably relied upon by experts in the particular field,"[7] we should proceed to evaluate the expert's methodology. Fed.R.Evid. 703.

The third factor is the *Frye* test. We ask whether in reaching his conclusion, the witness used a well-founded methodology or mode of reasoning, one "sufficiently established to have gained general acceptance in the particular field in which it belongs." *Frye*, 293 F. at 1014; *see also Osburn v. Anchor Laboratories, Inc.*, 825 F.2d 908 (5th Cir. 1987), *cert. denied*, 485 U.S. 1009, 108 S.Ct. 1476, 99 L.Ed.2d 705 (1988). As long as the expert's methodology is well founded, the nature of the expert's conclusion is generally irrelevant, even if it is controversial or unique. *See Peteet v. Dow Chemical Co.*, 868 F.2d 1428 at 1433 (5th Cir. 1989); *Osburn*, 825 F.2d at 915.[8] In fact, in *Osburn* the plaintiff's and the defendant's experts relied on essentially the same diagnostic methodologies but drew opposite conclusions from the available information. We did not attempt to determine which expert's conclusion was more in line with the consensus in the scientific community. Instead we stated, "a jury must be allowed to make credibility determinations and weigh the conflicting evidence in order to decide the likely truth of a matter not itself initially resolvable by common knowledge or lay

[7] *See Greenwood Util. Comm'n. v. Mississippi Power Co.*, 751 F.2d 1484, 1495 (5th Cir. 1985) (stating that, had trial court's ultimate decision turned on expert's testimony, appellate court would have remanded for factual finding whether the evidence relied on was of the type usually relied on by experts; also stating that trial court should accord deference to expert's assertion that the experts in the field rely on similar evidence) (dicta).

[8] This principle, however, is not wholly open-ended, but, as we observed in Osburn, is rather designed for application in instances "where science has some meaningful information" to offer on the subject – as opposed to mere "theoretical speculation" – and "scientific 'truth' has not so completely hardened as to prevent legitimate difference of true expert opinion in a particular concrete context." *Id.* at 915 n. 10. If science has thus hardened or if what science offers is essentially no more than theoretical speculation, then well-founded methodology and reasoning may not alone suffice. *See Brock v. Merrell Dow Pharmaceuticals*, 874 F.2d 307 (5th Cir.1989), *cert. denied*, — U.S.—, 110 S.Ct. 1511, 108 L.Ed.2d 656 (1990).

Moreover, even though the Osburn criteria are met, the opinion may nevertheless be excludable under Rule 403.

reasoning." *Id.* at 916. "An expert's opinion need not be generally accepted in the scientific community before it can be sufficiently reliable and probative in support of a jury finding." *Osburn*, 825 F.2d at 915 (emphasis added).[9]

Finally, Rule 403 serves a general screening function for otherwise admissible evidence. Assuming the witness's testimony is relevant and the witness is qualified, and assuming his testimony has the appropriate factual basis and his methodology is well founded, the only remaining inquiry is the balancing authorized in Rule 403: "Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence." In the 403 balancing inquiry, courts may consider issues that were appropriately excluded from the three

[9] One commentator has sought to capture the distinction between an expert's methodology (or reasoning) and an expert's conclusion by evaluating the former according to its scientific "validity" and the latter according to its legal "reliability." Bert Black, *A Unified Theory of Scientific Evidence*, 56 Fordham L.Rev. 595 (1988). Black explains the distinction as follows:

> Validity and reliability, though intertwined, are very different concepts. One normally speaks of "valid" rather than "reliable" reasons or theories, and of "reliable" rather than "valid" instruments or machines. Results, conclusions, or techniques may be either valid or reliable. Behind these simple examples of everyday usage lie largely overlooked conceptual distinctions and relationships that are fundamental to a coherent legal theory of scientific evidence.... [R]eliability means that a successful outcome, or a correct answer, is sufficiently probable for a given situation.... In contrast to reliability, validity means that which results from sound and cogent reasoning. An invalid conclusion cannot be reliable, yet valid reasoning does not necessarily lead to reliable conclusions. Reliability is the ultimate legal concern, but when it hinges on controversial contested reasoning, the validity of that reasoning must be addressed. Distinguishing between validity and reliability is important because it permits the separation of scientific questions from legal questions.... [T]he scientific question [should be viewed] as a matter of *validity*, with the answer depending on accepted scientific practice and the soundness and cogency of the entire pattern of reasoning leading to the expert's conclusion. In contrast, the legal question relates to how much *reliability* the law requires, with the answer depending on legal standards.

Id. at 599-600.

preceding threshold inquiries, which are narrower in scope. If, taking all considerations into account, a court finds that the potential for prejudice substantially outweighs the probative value, the court may opt to exclude the testimony.[10] Unlike Rules 702 and 703, which define admissibility thresholds for expert-opinion evidence, Rule 403 "creates a power to exclude otherwise admissible evidence; it gives no discretion to admit evidence that is subject to exclusion under some other rule." 22 C. Wright & K. Graham, *Federal Practice & Procedure*, § 5213 at 258-59 (1978). We caution, however, that clearing the hurdles of Article VII of the Federal Rules of Evidence will not alone ensure approval under Rule 403. An application of these principles to this case follows.

IV.

Rule 702: Qualifications

Although the district court did not conclude that Dr. Miller was unqualified to testify under Rule 702, it did question his qualifications:

> Dr. Miller is not an expert in either oncology or pathology. Miller's opinion as to the cause of Christophersen's death was formed without consultation with oncologists or other cancer specialists. Dr. Miller's experience with cancer occurred during his residency when he assisted in a study of the immune system as affected by smoking and asbestos. Dr.

[10] As Judge Learned Hand once observed, expert testimony creates the risk of a special kind of prejudice:

> The trouble with all this is that it is setting the jury to decide, where doctors disagree. The whole object of the expert is to tell the jury, not facts, as we have seen, but general truths derived from his specialized experience. But how can the jury judge between two statements each founded upon an experience confessedly foreign in kind to their own? It is just because they are incompetent for such a task that the expert is necessary at all.

Hand, *Historical and Practical Considerations Regarding Expert Testimony*," 15 Harv.L.Rev. 40, 53 (1901).

> Miller does not routinely treat cancer patients, nor has he ever treated a patient with a colon cancer of the type that affected Christophersen.

(citations omitted).

The trial court's concerns are understandable. As we stated in *Peteet*, "district judges and appellate courts must carefully review an expert's testimony to ensure that the expert has the necessary qualifications and a sufficient basis for his opinion." 868 F.2d at 1431; *Lavespere*, 910 F.2d at 176 (citing *Peteet*); *see also In Re Air Crash Disaster at New Orleans, Louisiana*, 795 F.2d 1230 at 1234-35 (5th Cir. 1986) ("Trial judges must be sensitive to the qualifications of persons claiming to be an expert."). We caution, however, that although credentials can be significant, they alone are not necessarily determinative. The questions, for example, do not stop if the expert has an M.D. degree. That alone is not enough to qualify him to give an opinion on every conceivable medical question. This is because the inquiry must be into actual qualification -- sufficient to assist the trier of fact. *Viterbo*, 826 F.2d at 422. The trial judge here rightly scrutinized Dr. Miller's lack of specialized experience and knowledge. The district court did not base its disallowance of Dr. Miller's testimony on this issue, however. It preferred to rely on Rule 703 and the witnesses' methodology. We, therefore, move to those issues.

Rule 703

Dr. Miller premised his opinion that Marathon caused Christophersen's cancer on his belief that Christophersen had approximately a twenty-year history of "extensive exposure to nickel and cadmium fumes in the work place." The district court, pursuant to Rule 703, analyzed the underlying "facts and data" of Dr. Miller's opinion to determine whether it was based on the types of facts reasonably relied upon by experts in the field.[11] Dr. Miller testified at his

[11] Rule 703 of the Federal Rules of Evidence provides that:

> The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

deposition that the level and duration of the patient's exposure are important considerations when evaluating the effect of exposure to a toxic substance.

The district court found that virtually all of the factual data concerning Christophersen's exposure to nickel and cadmium came from the affidavit of a Marathon employee named Edgar Manoliu (Manoliu), who described the fumes and Christophersen's exposure to them. The district court criticized this affidavit, however, as being inaccurate and incomplete. The Manoliu affidavit appears to have over-estimated the number of times per week Christophersen visited the manufacturing area, as well as the average length of time he would remain there on each visit. The affidavit was also devoid of any information about the type of fumes to which Christophersen was exposed or the type of fumes generated by the battery manufacturing process.

We find particularly telling Manoliu's admission in his deposition that he did not know the chemical composition of the fumes nor the mix of chemicals in the impregnation and soak tanks.

Nor was Dr. Miller informed as to the physical facilities at the Marathon plant, including the size of the plant or the impregnation and soak area, or the ventilation available in these areas or in Christophersen's office. In addition, Dr. Miller did not always rely upon the accurate data that were contained in the affidavit. For example, the affidavit correctly indicated that Christophersen worked for fourteen years at the Waco plant before his death. Dr. Miller, however, based his opinion upon the assumption that Christophersen worked in the plant for twenty years. Thus Dr. Miller over-estimated the duration of Christophersen's exposure by approximately fifty percent. Accordingly, accurate dosage and exposure information was not used by Dr. Miller.

Thus the court validly called into question the facts and data relied upon by Dr. Miller in forming his opinion. *Slaughter v. Southern Talc Co.*, 919 F.2d 304 (5th Cir. 1990), reiterated the requirements under Rule 703:

> As a general rule, questions regarding the scientific bases of an expert's opinion "affect the weight to be assigned that

opinion rather than its admissibility and should be left for the jury's consideration." *Viterbo v. Dow Chemical Co.*, 826 F.2d 420, 422 (5th Cir. 1987). *See also, Dixon v. International Harvester Co.*, 754 F.2d 573, 580 (5th Cir. 1985). However, this general rule yields when "the source upon which an expert's opinion relies is of such little weight ... that [the] testimony would not actually assist the jury in arriving at an intelligent and sound verdict." *Viterbo*, 826 F.2d at 422. In such case, this court requires courts to examine the reliability of an expert's sources to determine whether they satisfy the threshold established by the rule. *See Soden v. Freightliner Corp.*, 714 F.2d 498, 502 (5th Cir. 1983).

Id. at 306-07.

Plaintiffs do not contest the district court's findings as to the deficiencies in the Manoliu affidavit. Rather, they argue that Dr. Miller stated in his opinion that dosage was less important when determining *individual* causation. Plaintiffs accordingly argue that any deficiencies in the underlying facts and data go to the weight of Dr. Miller's opinion rather than its admissibility. We disagree. If the dosage of the harmful substance and the duration of exposure to it are the types of information upon which experts reasonably rely when forming opinions on the subject, then the district court was justified in excluding Dr. Miller's opinion that is based upon critically incomplete or grossly inaccurate dosage or duration data. *See Soden*, 714 F.2d at 506. *See also Slaughter v. Southern Talc Co.*, 919 F.2d 304, 306 (5th Cir. 1990) (affidavits of two doctors that "represented nothing more than bare conclusions derived from erroneous data" held inadmissible for summary judgment purposes); *Washington v. Armstrong World Indus., Inc.*, 839 F.2d 1121, 1123-24 (5th Cir. 1988) (expert's conclusions "lacked probative value because it was pure speculation based on negative inferences drawn from the testimony of three treating physicians"); *Thompson v. Southern Pac. Transp. Co.*, 809 F.2d 1167 (5th Cir. 1987), (expert's opinion on dioxin as source of plaintiff's illness had "insufficient factual basis" because expert had no knowledge of the amount or duration of the exposure).

As we have noted, Rule 703 seeks to ensure that the "facts and data" not otherwise admissible in evidence that form the basis of an

expert's opinion are "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject." Although this rule is primarily directed toward permitting an expert to base his opinion on hearsay or otherwise inadmissible sources, *Barrel of Fun, Inc. v. State Farm Fire & Casualty Co.*, 739 F.2d 1028, 1033 (5th Cir. 1984), the inquiry into the "types" of "facts and data" underlying an expert's testimony is not limited to the admissibility of that data. District judges may reject opinions founded on critical facts that are plainly untrustworthy, principally because such an opinion cannot be helpful to the jury.[12]

The argument that Rule 703 addresses only generic facts and data and is unconcerned with the sufficiency and accuracy of underlying facts as they relate to the case at hand, will lead to the irrational result that Rule 703 requires the court to admit an expert's opinion even if those facts and data upon which the opinion are based are crucially different from the undisputed record. Such an interpretation often will render Rule 703 impotent as a tool for testing the trustworthiness of the facts and data underlying the expert's opinion in a given trial. Certainly nothing in Rule 703 requires a court to admit an opinion based on facts that are indisputably wrong. Even if Rule 703 will not require the exclusion of such an unfounded opinion, general principles of relevance will. In other words, an opinion based totally on incorrect facts will not speak to the case at hand and hence will be irrelevant. In any event such an opinion will not advance the express goal of "assisting the trier of fact" under Rule 702.[13]

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[12] *See e.g., Slaughter v. Southern Talc Co.*, 919 F.2d 304 (5th Cir. 1990); *Brown v. Parker-Hannifin Corp.*, 919 F.2d 308 (5th Cir. 1990); *Edmonds v. Illinois Cent. Gulf Ry. Co.*, 910 F.2d 1284 (5th Cir. 1990); *Brock v. Merrell Dow Pharmaceuticals*, 874 F.2d 307 (5th Cir. 1989), *cert. denied*, — U.S. —, 110 S.Ct. 1511, 108 L.Ed.2d 646 (1990); *Washington v. Armstrong World Indus, Inc.*, 839 F.2d 1121 (5th Cir. 1988); *Viterbo v. Dow Chemical Co.*, 826 F.2d 420 (5th Cir.1987); *Osburn v. Anchor Laboratories, Inc.*, 825 F.2d 908 (5th Cir. 1987); *Thompson v. Southern Pac. Trans. Co.*, 809 F.2d 1167 (5th Cir. 1987); *In re Air Crash Disaster at New Orleans, Louisiana*, 795 F.2d 1230 (5th Cir. 1986); *Soden v. Freightliner Corp.*, 714 F.2d 498 (5th Cir. 1983). *But see Peteet v. Dow Chemical Co.*, 868 F.2d 1428 (5th Cir. 1989); *Dixon v. International Harvester Co.*, 754 F.2d 573 (5th Cir. 1985).

[13] Further, even if experts may generally rely on a certain source or quantum of data in the absence of contrary or more complete information, this may not suffice to admit an opinion critically resting on the former, when significantly different

We do not of course say that Rule 703 requires that all facts and data underlying the opinion must relate perfectly to the record facts. As we have pointed out, only when the facts and data are critically inaccurate or incomplete, as determined by what other experts would or would not be willing to base opinions upon, would the facts and data lack the necessary requisites of Rule 703. The district court in this case did not abuse its discretion.

Frye: Well-Founded Methodology

When analyzing the validity of an expert's methodology, we seek to determine whether it connects the facts to the conclusion in a scientifically valid way.[14] We answer this question by applying the *Frye* test: whether the methodology or reasoning that the expert uses to connect the facts to his conclusion is generally accepted within the relevant scientific community.[15]

In his deposition Dr. Miller stated that the kinds of evidence most often used to establish causation are human epidemiological studies, live animal testing, and in vitro testing. Defendants' experts agreed, but went a step further; they stated that the determination of the pathogenesis of a particular type of cancer *requires* clearly positive results from one or more of these types of testing. The district court was persuaded that it was inconsistent for Dr. Miller, on one hand, to conclude that these are the main methodologies and, on the other hand, to concede that he did not effectively rely on any of them. That epidemiological, animal, and in vitro studies are, as Dr. Miller said, the primary methods by which medical experts develop their theories of causation is not to say that Miller's methodology was invalid. The Frye question focuses on the proffered methodology alone and looks to the scientific community to determine if general support for that methodology exists.

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and more accurate or complete information is established beyond reasonable dispute in the record.

[14] *See* Black, *A Unified Theory of Scientific Evidence*, 56 Fordham L.Rev. 595 (1988).

[15] We have applied *Frye* in a civil, as well as a criminal, case. *See Barrel of Fun*, 739 F.2d 1028.

The critical portion of Dr. Miller's opinion, as it relates to causation, is as follows:

> 'the same sorts of chemicals and exposures that are associated with small-cell carcinoma of the lung are likely to be associated with small-cell carcinoma elsewhere in the body.'

[*Christophersen v. Allied-Signal Corp.*,] 902 F.2d 362, 365-66 (5th Cir. 1990). Dr. Miller offered no scientific methodology to support this assertion. Dr. Sherwood Gorbach concluded that:

> Dr. Miller's presumption that nickel and cadmium have been associated with a certain type of cell in lung cancer and therefore should be associated with a similar type of cell in the colon has no support in medical science and is without foundation.

The other defense expert, Dr. Richard Rudder, held the same view of Dr. Miller's methodology.[16] All Dr. Miller had was a scientific hunch, which as far as the record shows, no one else shares. This was enough to support further investigation but was inadequate to support a judgment in favor of Christophersen. The district court found that "Dr. Miller's conclusion that a small cell carcinoma of the lung is likely to be associated with a small cell carcinoma located elsewhere in the body is 'without precedent in cancer epidemiology and is not scientifically correct.'" This finding of what is a scientifically correct conclusion is not for the district court. However, we cannot say that the district court erred in excluding Dr. Miller's testimony. To the contrary, the district court was within its discretion in concluding, albeit implicitly, that Dr. Miller's testimony failed to meet the third threshold test, the *Frye* test.

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[16] The *Christophersen* panel concluded that the district court, as well as the defendants' experts, by overemphasizing Dr. Miller's reliance on the fact that small-cell carcinoma in the colon looks similar to small-cell carcinoma in the lung, misunderstood and oversimplified Dr. Miller's theory of causation. 902 F.2d at 366. The panel then stated that, "Dr. Miller's analysis was based on the nature of the biochemical reaction that results in the development of small cell carcinoma." *Id.* We are persuaded, however, that under the standard of review of manifest error the defense experts' testimony and the district court's finding were sufficiently broad to be understood as rejecting Dr. Miller's methodology.

Rule 403: Prejudice versus Probativeness

Because we find that Dr. Miller's testimony failed to clear either the Rule 703 or the *Frye* hurdle, we need not consider the district court's application of Rule 403.

V. CONCLUSION

The foregoing analysis demonstrates that this was not a "battle of experts" that would be improper for resolution on summary judgment. The district court's ruling that Dr. Miller's opinion was inadmissible was not manifestly erroneous. Because Dr. Miller's testimony was the only evidence of causation, the district court did not err in granting summary judgment for defendants.

AFFIRMED.

CLARK, Chief Judge, concurring in the result:

The plain words of the carefully created, thoroughly reviewed, fully annotated Federal Rules of Evidence are for courts to follow, not embellish. I am perplexed by the fact that my colleagues in the majority embellish them and in dissent refuse to follow them.

The district court properly excluded expert opinion testimony that it correctly found to be substantially more prejudicial than probative. The majority *per curiam* approves exclusion, but does so by applying a homemade test for admissibility which not only disregards the plain meaning of the rules, but also builds in a headwind favoring exclusion of such evidence on a far broader basis than the rules permit. Judge Reavley's dissent demonstrates that the majority ignores, in part, and modifies, in part, two of the rules (702 and 703), yet refuses to recognize that the trial court's valid reliance on a third rule (403) requires affirmance. The confusing result of these divergent views could thwart the very reason the court took the case *en banc* -- to light the path district courts should follow in ruling on expert opinion evidence. I hope the result will

not be to cause trial judges in this circuit to think we have deprived them of their broad discretion to make fair rulings on the admissibility of such proof. The rules they are bound to follow still control.

Because the district court's ruling under Rule 403 is fully supported by the record, I concur in the result reached by the majority.

I. RULE 702.

Rule 702 defines the basic perimeter of expert opinion evidence:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

Obviously, a medical opinion as to causation would assist the trier of fact in this highly technical scientific case. As Judge Reavley's dissent establishes, it is equally obvious that Dr. Miller is a trained, experienced scientist who possesses specialized knowledge in toxicology and related fields. Both parts of the rule were satisfied. I agree with the district court and Judge Reavley that the summary judgment record establishes that Dr. Miller was qualified to testify as an expert under Rule 702.

The majority errs when it interprets Rule 702 to require *the expert's opinion* to assist the trier of fact. That is not what the rule says. Expert opinion testimony is admissible when "*scientific, technical, or other specialized knowledge* will assist the trier of fact to understand the evidence or to determine a fact in issue...." The advisory committee's notes make it clear that this rule focuses any question of assistance on the nature of the jury's factual inquiry rather than on the substance of the expert's testimony.

II. RULE 703.

In two clear English sentences, Rule 703 addresses the permissible evidentiary bases for expert opinion evidence.

> The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

As with Rule 702, the majority pays scant heed to Rule 703's plain language. The result is a confusing and internally inconsistent revision which gives almost no guidance to the district courts except to restrict the admissibility of expert opinion testimony in ways never intended by the Federal Rules of Evidence.

A. *Plain Words, Plain Meaning.*

The first sentence of Rule 703 allows an expert to base an opinion or inference on facts or data perceived by or made known to the expert at or before the hearing. As the advisory committee's notes explain, this sentence allows three sources for the bases of an expert's opinion: (1) the expert's firsthand observations of facts or data, (2) evidence presented at trial, and (3) presentation of information or data to the expert outside of the courtroom and other than by the expert's own perception. Dr. Miller had no contact with Christophersen. He did not testify at trial. Thus, neither source (1) nor source (2) is applicable. Dr. Miller's testimony falls into the third category.

Rule 703 broadened the ambit of admissible evidence allowed at common law. "The traditional view ... has been that an expert may state an opinion based upon his firsthand knowledge or based upon facts in the record at the time he states his opinion, or based partly on firsthand knowledge and partly on the facts of the record." E. Cleary, *McCormick on Evidence* § 14, at 31 (2d ed. 1976). This view barred experts from basing their opinions on facts or data presented to them outside of the courtroom other than such as were gained through the expert's own perception. The most significant concern underlying this view was hearsay. McCormick states it this way:

> A question is improper if it calls for the witness' opinion on the basis of reports that are not in evidence or are inadmissible as substantive evidence under the hearsay rule (without reciting their contents as hypotheses, to be supported by other evidence as to their truth). The essential objection seems to be that the jury is asked to accept as evidence the witness' inference, based upon someone's hearsay assertion of a fact which is, presumably, not supported by any evidence at the trial and which therefore the jury has no basis for finding to be true.

Id., § 15 at 34.

The second sentence of Rule 703 adopted a new approach to trustworthiness. It allows the expert to rely on inadmissible facts or data if they are of a type reasonably relied upon within the expert's community. *See United States v. Williams*, 447 F.2d 1285, 1290-91 (5th Cir. 1971) (en banc), *cert. denied*, 405 U.S. 954, 92 S.Ct. 1168, 31 L.Ed.2d 231 (1972). Trustworthiness of facts or data not tested for admissibility is gained through the assurance that the expert's scientific community reasonably relies on them for the same purpose. *See id.* at 1290. For example, Rule 703 would permit a doctor to give a diagnostic opinion based upon facts contained in examination or test reports made by hospital technicians even if such reports were inadmissible hearsay, if it is shown that other doctors reasonably rely on such reports when forming similar opinions. Rule 703 says nothing more than that the facts or data need not be admissible in evidence if the reliability inquiry is otherwise satisfied.

If the facts or data are admissible, Rule 703 does not authorize exclusion of the expert opinion. If they are admissible, the inquiry ends, and nothing in Rule 703 authorizes exclusion of the expert's testimony. If they are not admissible, the district court must determine whether the reliability inquiry is satisfied. If it is satisfied, Rule 703 does not authorize exclusion. If it is not, the district court should exclude the testimony. No other reading is consistent with the plain language, history, and purpose of Rule 703.

Both sentences of Rule 703 apply just to the "facts or data" upon which an expert bases an opinion. Rule 703 does not address "methodology" -- how the expert uses the facts or data to form an opinion. Rule 703 does not authorize a court to approve or disap-

prove the expert's conclusion. The words of Rule 703 allow use of facts or data "of a *type* reasonably relied upon by experts in the particular field in forming opinions or inferences upon the *subject*...." The court's inquiry is not whether experts in the relevant field would reasonably rely on the *particular* facts or data used by the expert witness. Nor does Rule 703 require a court to determine whether experts in the field would reasonably rely on the same type of facts or data to reach the expert witness's actual opinion. The rule is met if similar experts use facts or data of the same kind to form opinions on the subject in issue. *Cf., Soden v. Freightliner Corp.*, 714 F.2d 498, 503 (5th Cir. 1983).

B. A Wrong Turn Followed.

In *Viterbo v. Dow Chem. Co.*, 826 F.2d 420 (5th Cir. 1987), this circuit began disregarding the plain language of Rule 703. *Viterbo* held that expert opinion testimony may be excluded under Rule 703 if, without regard to the admissibility of the underlying facts or data, other experts in the field would reasonably rely on the facts and data assumed by the expert witness. *See id.* at 422-24. This interpretation is erroneous for two reasons. First, it disregards the fact that the reliability of the facts and data underlying the expert's opinion only comes into question if the facts and data are not admissible. Second, it disregards the fact that Rule 703's reliability inquiry addresses only the "type" of facts and data used by the expert witness and whether experts in the field would reasonably rely on facts or data of that type in forming opinions "upon the subject." This reliability inquiry provides the only necessary and proper guarantee of trustworthiness.

After *Viterbo*, our cases continued to follow this erroneous construction. *See, e.g., Slaughter v. Southern Talc Co.*, 919 F.2d 304 (5th Cir. 1990); *Brown v. Parker-Hannifin Corp.*, 919 F.2d 308 (5th Cir. 1990); *Washington v. Armstrong World Indus., Inc.*, 839 F.2d 1121 (5th Cir. 1988) (per curiam); *Peteet v. Dow Chem. Co.*, 868 F.2d 1428 (5th Cir. 1989), *cert. denied*, --- U.S. ----, 110 S.Ct. 328, 107 L.Ed.2d 318 (1989); *Orthopedic & Sports Injury Clinic v. Wang Laboratories, Inc.*, 922 F.2d 220 (5th Cir. 1991).

This *en banc* court errs when it does not overrule *Viterbo* and its progeny to the extent that they conflict with Rule 703. We should

not follow these cases another step.

After the majority's footnote 4 states the correct reading of Rule 703, the opinion abandons the concept that the reliability inquiry only applies when the expert's facts or data are inadmissible. No mention is made of the admissibility of the facts and data upon which Dr. Miller relied. This is a critical mistake because the facts and data he used should have been considered admissible in evidence.

The majority opinion also approves the district court's Rule 703 analysis which criticizes Dr. Miller's facts and data as insufficient support for his conclusion that nickel and cadmium exposure caused Christophersen's cancer. The Rule 703 analysis is not concerned with whether the facts and data relied on by the expert support the expert's actual opinion. Even inadmissible facts or data are tested only to determine whether experts in the field would rely on the type of facts or data relied on by Dr. Miller in forming opinions on the subject of cancer causation.

The majority *per curiam* responds to this latter criticism with illogic. It reasons that giving plain meaning to the words "type" and "upon the subject" "will lead to the irrational result that Rule 703 requires the court to admit an expert's opinion even if those facts and data upon which the opinion is based are crucially different from the undisputed record." This stops the process too soon. The fact that Rule 703 does not preclude admissibility does not require that an improperly supported opinion must be admitted. Evidence that passes Rule 703 may be excludable under other rules. For example, the opinion might be irrelevant under Rule 401 or substantially more prejudicial than probative under Rule 403.

The majority says that giving the rule its plain meaning "often will render Rule 703 impotent as a tool for testing the trustworthiness of the facts and data underlying the expert's opinion in a given trial." This criticism grafts onto the rule a function that is incompatible with its language and purpose. The trustworthiness aspect of the reliability inquiry has nothing to do with whether the expert's facts or data provide sufficient support for the expert's opinion. Rule 703 does not say that the facts or data upon which an expert witness bases an opinion must supply reasonably reliable support for that opinion. Rather, the rule treats the reliability inquiry as a sufficient guarantee that an expert's *inadmissible* facts or data are sufficiently trustworthy to overcome the reasons why they are

inadmissible. The rules deal with fundamentally unsupported but relevant expert opinions only in terms of probity versus prejudice under Rule 403, discussed below.

C. Rule 703 Applied.

In today's case, the facts and data upon which Dr. Miller based his opinion were the Manoliu affidavit, Christophersen's medical records, and medical literature. Judge Reavley's dissent sets them out in careful, complete, and correct detail. In rendering summary judgment, the district court did not expressly determine that these facts and data could not have been admitted in evidence. For summary judgment purposes, the facts contained in Manoliu's affidavit should have been considered admissible at trial in the form of Manoliu's direct testimony. The facts contained in the medical records should have been considered admissible in the form of direct testimony by those who made the records or as records of regularly conducted activity. *See* Fed.R.Evid. 803(6). Medical records also might be the type of sources of information upon which cancer experts reasonably rely when forming their opinions as to the causes of a person's cancer. No competent summary judgment proof suggests that they were not. The data contained in the medical literature would have been admissible over a hearsay objection under the learned treatise exception to the hearsay rule. *See* Fed.R.Evid. 803(18). The majority and the district court did not consider whether the facts and data relied on by Dr. Miller were admissible.

The district court also attempted to determine whether experts in the field of cancer research would have reasonably relied on the *particular* facts and data used by Dr. Miller (the Manoliu affidavit, medical literature, and medical records) to form his actual opinion (that nickel and cadmium caused Christophersen's colon cancer). This analysis was also improper. Rule 703 only asks the court to determine whether experts in the field of cancer research would have reasonably relied on facts or data of this "type" in forming opinions or inferences "upon the subject" of cancer causation.

Insistence on a punctilious observance of the intended operation of Rules 702 and 703 does not put form over substance. Rather it enforces the spirit of the Federal Rules of Evidence which provide

the trier of fact with all but a narrow band of relevant evidence. Evidence authorized by the literal terms of Rules 702 and 703 may not be excluded unless the court balances probity against substantially greater prejudice as required by Rule 403, discussed below. The majority opinion destroys the value of that weighing because it allows district courts to exclude expert opinions under Rules 702 and 703 for reasons those rules do not permit.

Because the district court's analysis of Dr. Miller's testimony was premised on an incorrect legal interpretation of Rule 703 that would deprive a jury of evidence it should be able to consider, I agree with Judge Reavley that exclusion on the basis of Rule 703 was manifestly erroneous and that the majority erred in basing affirmance on this rule.

III. *FRYE.*

I completely agree with Judge Reavley's analysis of the limited history of *Frye* in this circuit and criticism of its adoption here. I support his views with three additional points. First, if *Frye* is a rule of evidence, it has not survived the enactment of the Federal Rules of Evidence. See 3 J. Weinstein & M. Berger, *Weinstein's Evidence* ¶ 702[03], at 702-36 (1990); 22 C. Wright & K. Graham, *Federal Practice and Procedure* § 5169, at 108 (1978). Second, if it is a substantive rule, its adoption in diversity cases is foreclosed by *Erie*. Until today, this circuit has limited *Frye* to a narrow class of federal criminal cases to which *Erie* does not apply. Third, *Frye* is neither a good rule nor one the Court must adopt to decide this case. Rather than extending Judge Reavley's critique of *Frye*, I simply note that the three leading treatises on the law of evidence support my position that Rule 403 is the better test. *See* E. Cleary, *McCormick on Evidence* § 204, at 491 (2d ed. 1976); 3 J. Weinstein & M. Berger, *Weinstein's Evidence* ¶ 702[03], at 702-34-44 (1990); 22 C. Wright & K. Graham, *Federal Practice and Procedure* § 5168, at 86-91 (1978).

IV. RULE 403.

In clear declaratory language, Rule 403 grants a limited power

to exclude evidence.

> Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.

With a footnote, the majority dismisses the pertinence of Rule 403 to today's case. The district court's application of Rule 403 is essential to the outcome of the appeal. Individual rules cannot be read in isolation. Rule 403 is as much a part of the Rules of Evidence that govern this case as Rules 702 and 703. If it were not, I would agree with Judge Reavley and join his dissent. However, since it applies as strongly to expert opinion testimony as it does to any other evidence, *see* 1 J. Weinstein & M. Berger, *Weinstein's Evidence* ¶ 403[01], at 403-5 (1989), I would affirm the district court's decision to rely on it to exclude Dr. Miller's testimony.

Rule 403 allows a court to exclude relevant evidence when its probative value is substantially outweighed by the danger of unfair prejudice. An expert's opinion may be based on such erroneous facts or data, such proven unsound methodology, or such internally inconsistent reasoning that its probative value is minimal. I agree with the majority's footnote 10 which acknowledges that expert testimony may create a special kind of prejudice. When an opinion, especially one a lay person finds as arcane and speculative as cancer causation, is based on erroneous data, reasoning, or methodology, qualifying the opining witness as a medical expert carries a likely danger than the opinion will be substantially more prejudicial than probative. The fact that a witness is labeled an "expert" under Rule 702 would certainly be an improper basis for a jury's decision to believe the witness's opinion.

These principles introduce no new concepts into our jurisprudence. While I reject *Viterbo*'s departure from the plain meaning of Rule 703, I agree with its reasoning that if an opinion is fundamentally unsupported, then it offers no expert assistance to the jury; and that lack of reliable support can render an opinion substantially more prejudicial than probative, making it inadmissible under Rule 403. *Viterbo*, 826 F.2d at 422; *see also Washington v. Armstrong World Indus., Inc.*, 839 F.2d 1121, 1123-24 (5th Cir. 1988) (per curiam).

Judge Reavley's dissent maintains that, by excluding Dr. Miller's testimony, the district court took a fact issue from the jury. An analysis of probity versus unfair prejudice almost always depends to some extent on facts, but where undisputed proof supports the district court's conclusion as it does here, the issue is one properly decided by the court. When a permissible evidentiary ruling, supported by undisputed facts, excludes evidence, it takes away nothing that is proper grist for a jury.

In today's case, the undisputed record confirms that Dr. Miller relied on erroneous factual assumptions. Dr. Miller formed his opinion and testified at his deposition without any accurate information on Christophersen's exposure. Dr. Miller admitted that a person's level of exposure to possible carcinogens is critical. The studies on which he relied indicate that carcinogens exhibit a dose-response effect. Dr. Miller's only source of information on exposure was Manoliu's affidavit. Significantly, Manoliu had no idea how much, if any, nickel and cadmium was present in the fumes. Dr. Miller formed his opinion and testified at his deposition without any knowledge of what particles or compounds were present in the fumes or in what concentration, the size of the impregnation and soak rooms where the fumes originated, and the physical structure and ventilation in the plant and Christophersen's office. Dr. Miller's only basis for his assumption that the fumes contained any nickel and cadmium at all was Manoliu's bare assertion that these compounds were present in the fumes because the fumes were irritating. When Dr. Miller was confronted with the fact that he had formed his opinion without any credible exposure data, his sole response was that he would not change his opinion unless it was shown that the fumes contained absolutely no nickel and cadmium. He failed even to attempt to justify this unique view which was at odds with his own view that the level of exposure was critical and contrary to the dose-response effect detailed in the studies on which he relied.

Dr. Miller's reasoning and methodology were also seriously deficient. He asserted that nickel and cadmium caused Christophersen's small cell colon cancer because they have been associated with small cell cancer of the lung despite the fact that he could cite no authoritative sources for this type of associative reasoning. The uncontradicted summary judgment evidence indicated that, without

additional support, Dr. Miller's presumption that nickel and cadmium should be associated with cancerous cells in the colon because they have been associated with a similar type of cancerous cell in the lung is without precedent in cancer epidemiology and has no foundation in medical science. Moreover, Dr. Miller agreed that the determination of the pathogenesis of a particular form of human cancer requires human epidemiological studies, animal studies, and in vitro testing. He conceded that he had never seen an epidemiological or animal study demonstrating a causal association between exposure to nickel and/or cadmium and colon cancer.[1]

I do not disagree with the dissent's view that Dr. Miller's testimony passed Rules 702 and 703. I very much disagree with its view that the court was *required* to admit his opinion testimony because the provisions of these two rules were met. The trial court was requested to review the evidence under Rule 403. He did so and concluded that Dr. Miller's testimony should be excluded.

Under the undisputed portions of the summary judgment record, the trial judge could find that Dr. Miller's opinion was supported only by his credentials and his persistent refusal to acknowledge the inadequacy of his methodology. The district court determined that the probative value of Dr. Miller's testimony was substantially outweighed by the danger of unfair prejudice. To reverse this Rule 403 ruling, we must find manifest error. There was none.

V. CONCLUSION.

The majority opinion distorts or ignores the letter and spirit of the Federal Rules of Evidence. Today's case ought to be decided based on the plain language of the three applicable rules. By overlaying these rules with its own agenda for exclusion, the majority disserves our trial judges in this difficult area of their work. The dissent's refusal to acknowledge that the district court

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[1] Judge Reavley observes that Dr. Miller's contract with Tufts University required him to deliver all consultation fees to the medical school. The suggestion of unbiased objectivity is open to question. The record also indicates that, at the time Christophersen's lawyer hired him in response to an advertisement in a national legal periodical, Dr. Miller had recently agreed to join the Tufts faculty and was not aware that his new contract would prevent him from continuing to earn money from consulting with lawyers.

should be trusted to weigh probity against substantial unfair prejudice is equally in error. Because I cannot join either opinion, I respectfully concur only in the affirmance of the appealed judgment.

REAVLEY, Circuit Judge, with whom KING, JOHNSON and WIENER, Circuit Judges, join, dissenting:

The judges of this court have in recent years been sending warning signals about their displeasure with expert testimony.[1] Today the court "takes hold" of expert testimony by taking over. The *per curiam* opinion effectively allows judges to decide the reliability, weight, and relative merit of expert opinions, at least in toxic tort cases. And with such control, we signal a willingness to increase the proof and persuasion burdens of the disfavored party. The author of the *per curiam* claims to "introduce no new concepts to our jurisprudence." Surely my colleagues know better, or at least they should know that their use of these concepts confuses the admissibility of evidence with the sufficiency of evidence, changes the rules of evidence without benefit of amendment, denies Mrs. Christophersen her right to trial by jury, and eliminates substantive rights in tort cases where federal courts have only diversity jurisdiction.

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[1] *See, e.g., In re Air Crash Disaster at New Orleans*, 795 F.2d 1230, 1234 (5th Cir. 1986) ("Our message to our able trial colleagues: it is time to take hold of expert testimony in federal trials."); *Randolph v. Laeisz*, 896 F.2d 964, 968 (5th Cir. 1990) ("we here echo the message given to our able trial colleagues in *In re Air Crash Disaster* ..."); *Brock v. Merrell Dow Pharmaceuticals, Inc.*, 874 F.2d 307 (5th Cir. 1989) (rejecting the testimony of six experts because the court disagreed and found no satisfactory epidemiologic support), *cert. denied*, — U.S. —, 110 S.Ct. 1511, 108 L.Ed.2d 646 (1990); *Viterbo v. Dow Chemical Co.*, 826 F.2d 420 (5th Cir. 1987) (expert opinion inadmissible under Rule 703 if the basis for the opinion is unreliable).

I. The Record

The *en banc* court perpetuates the district court's lack of study or appreciation of the record. Lengthy depositions were taken of three witnesses for the plaintiff. Dr. Waymon Johnston, an industrial engineering professor, testified to the negligence of the defendants in failing to warn of the deadly hazard of nickel and cadmium exposure. Christophersen's co-worker, Edgar Manoliu, testified about the conditions at the plant where Christophersen worked and his exposure to nickel and cadmium. And Dr. Miller testified that in his opinion it was that exposure which caused the colon cancer leading to Christophersen's death. The defendant presented four affidavits of medical experts who disagreed with the opinion of Dr. Miller and denied that scientific proof exists that cadmium and nickel fumes can cause small-cell cancer in the colon. These affiants for the defendants did not say that science has disproved the opinion of Dr. Miller; they did not even address his discussion of links between toxic carcinogens and genetic abnormalities; and they did not submit to depositions and the revealing cross-examination to which seven defense attorneys subjected Dr. Miller during his two-day deposition. Upon that basis and without recourse to a jury, the district court and this court choose to accept the position of the defendants' doctors and deny Mrs. Christophersen a trial.

A. The Affidavit and Deposition of Edgar Manoliu

Edgar Manoliu worked at Marathon's manufacturing plant in Waco from 1972 until he retired from his position as production supervisor in 1985. He stated that Albert Christophersen, a design and applications engineer, officed in the main administration building from 1972 to 1980, and that his duties required him to visit the main production area two or three times per week for up to half an hour per visit. In 1980, the company assigned Christophersen to an office in the main production area of the plant, located in an enclosed cinder-block loft area, approximately sixty yards from the impregnation and soak room. Christophersen's windows and door generally remained open. According to Manoliu the manufacturing plant and the impregnation and soak room contained "many fumes

and gases" which "included heated fume and airborne particles of cadmium and nickel alloys." Christophersen's visits to the impregnation and soak room -- the site of the heaviest concentration of nickel and cadmium fumes -- continued at the rate of two to three times per week.

Manoliu did not testify to the precise composition or level of the fumes and dust. His expertise did not extend so far. Basing his testimony on personal knowledge and observation, Manoliu employed neither mathematics nor chemistry, but nevertheless adduced significant evidence of exposure. Christophersen's exposure occurred chiefly from visits to the impregnation and soak room, and from dust and fumes pervading the plant and his open office. Manoliu testified to a heavy concentration of nickel and cadmium fumes in the impregnation and soak room, the doors of which opened frequently. The impregnation and soak room process involved repeatedly dipping plaques on racks into bins of cadmium and nickel solutions for one to two minutes, then raising the racks to allow dripping. After dripping, the racks entered the dryers. Manoliu testified that the fumes emerged from the bins of cadmium and nickel solutions, as well as the dryers, and that lifting the racks out of solution created a "tremendous" release of fumes. He testified that all employees in the impregnation and soak room complained of the intolerable atmosphere, and attributed their scratchy throats and noses to the fumes (which were visible clouds) emerging from the soak baths and the dryers. Visitors to the area also experienced physical reactions.

Manoliu identified several sources of the fumes and dust that pervaded the plant and reached Christophersen's office through his open door and windows. Besides the concentrated fumes that emanated from the impregnation and soak area, the shearing of nickel and cadmium plaques created cadmium and nickel dust by cutting through "active areas" of nickel and cadmium plaques. The Waco plant, unlike other Marathon plants, did not have a vented exhaust system in the shearing area. Manoliu testified that workers in the shearing area eventually had to wear masks, and that Christophersen sometimes walked through the area.

The plaque-making area also generated significant quantities of nickel dust. Employees there had to wear small dust masks, but Manoliu testified that when they removed the masks, he observed dust "all over their noses," and that he reported this inadequacy to

a plant authority, who agreed to "look into it." No change occurred. Additionally, the tab room, which involved removal of residues with steel brushes, generated significant quantities of cadmium dust. This area was not enclosed, and Manoliu testified that "there was no exhaust system whatsoever."

Periodic problems with the scrubbers or the roof fans, which failed to pull excess fumes out of the plant, compounded the problem. Damp, muggy days created the worst conditions. Even if the ventilation system worked properly, high humidity prevented the exhaust system from carrying off sufficient quantities of the noxious dust and fumes.

Manoliu further testified that nickel and/or cadmium spills -- involving tank overflows of five to fifteen gallons onto the floors -- occurred about once a month near the impregnation tanks. Pipe leaks, during transfer of nickel nitrate and cadmium nitrate from trucks to the soak room, likewise occurred about once a month.

To the foregoing description of toxic exposure, Manoliu added the cancer toll affecting several Marathon friends and co-workers in the previous five to ten years. In his affidavit, he named eight people diagnosed or dead with cancer, including Albert Christophersen. In his deposition, Manoliu noted that his list of cancer victims included only people he personally knew, that he never investigated the matter, that he named only supervision and white-collar workers such as himself and Christophersen, and that he knew nothing about the medical histories of hourly employees. Manoliu is himself a cancer victim.

B. The Affidavit and Deposition of Dr. Lawrence Miller

1. The Causation Opinion

Dr. Miller stated that he reviewed Christophersen's medical records and autopsy report, as well as numerous medical articles and research materials addressing the effect of nickel and cadmium on humans.[2] He also relied on his extensive educational and clinical background, and on information about Christophersen's

[2] A record exhibit lists 33 relevant articles by title. These articles appear in the record.

work history and toxic exposure supplied by Manoliu. Dr. Miller concluded, based on reasonable medical probability, that the metastatic cancer which killed Christophersen was caused by his exposure to toxic nickel and cadmium fumes.

2. Dr. Miller's Qualifications

Despite "the Rule 702 concerns expressed by the district court," Dr. Miller is a board-certified specialist in internal medicine, pulmonary disease, and critical care medicine. His pulmonary disease specialty, primarily lung disorders, includes two years of patient care. He also notes specialization in epidemiology and toxicology, and he holds a Masters of Public Health in toxicology. His background in oncology includes courses at Harvard Medical School and internal medicine training, which involved substantial oncology exposure. He is not an oncology specialist, but oncology constitutes a subspecialty of internal medicine, in which he does specialize. Dr. Miller notes that an oncologist is more qualified in the treatment of cancer, but not necessarily more qualified concerning carcinogenesis. By the time of his deposition, Dr. Miller knew that his contract with Tufts University provided that all fees received for consultation services would go to the university.

3. Dr. Miller's Reasoning

Albert Christophersen had a villous adenoma which underwent a malignant transformation to a small-cell type of histology. His small-cell colon cancer then metastasized to his liver. Dr. Miller concluded, as follows, that toxic exposure to nickel and cadmium produced Christophersen's cancer.

a. Nickel, Cadmium, and Small-Cell Cancer

Nickel and cadmium cause cancer. The types of evidence honored by all of the experts -- epidemiology, animal studies, and *in vitro* studies -- establish the carcinogenicity of nickel and cadmium.[3] But did nickel and cadmium cause Christophersen's *colon* cancer?

Science *so far* has established specific links of nickel and

[3] Dr. Miller notes that some evidence, based on *in vitro* studies, suggests that nickel and cadmium act synergistically to produce cancer.

cadmium to lung, prostate, and renal cancers.[4] Villous adenoma *small-cell* cancers, which Christophersen had, are quite rare, and are associated with several toxic exposures. Research discloses an association between nickel and cadmium and small-cell lung cancer.[5] Small-cell carcinoma appears to be the same cell (identical histology) regardless of its location in the body, which is why medical literature does not necessarily address specific organ systems in discussing small-cell cancer. Dr. Jacqueline L. Torell, who performed the autopsy the day after Christophersen's death, described the tumor in his colon as being "morphologically quite similar to small-cell undifferentiated carcinoma most frequently arising in the lung." She noted that a few of the clusters had a somewhat papillary arrangement but there was not true gland formation or mucin typical of colon cancer. Recent medical evidence relates small-cell cancer to abnormal alterations of genetic materials.[6] One specific mechanism of nickel and cadmium

[4] Not all toxic substances are site-specific. For example, agents designated as "tumor promoters," such as radiation, are associated with a wide range of cancers, and there is some evidence that nickel is a tumor promoter.

[5] Dr. Miller concludes that while Christophersen's colon cancer was, more likely than not, primary and not metastatic, he could not rule out the possibility of a primary lung cancer, despite the negative autopsy findings. The lung primary could have been quite small, smaller than the metastasis, and thus missed by a representative autopsy. Autopsy sectioning does not describe the large number of sections required to find a small cancer. Moreover, he noted reported cases of primary regression while the metastasis continues. Of course, had a primary small-cell lung cancer been detected, we would not be here today, since the law would not be awaiting the imprimatur of organ-specific epidemiology. But Dr. Miller notes that his conclusion remains the same regardless of whether Christophersen had a primary lung cancer.

[6] *See, e.g.*, T. Norseth, *Metal Carcinogenesis*, Annals N.Y.Acad.Sci., 534:377-86 (1988); H. Sky-Peck, *Trace Metals and Neoplasia*, Clin.Physiol.Biochem. 4:99-111 (1986). The Redmond study (1983), addressed by the district court, indicates an increase in cancer of the liver and large intestine among nickel alloy workers, but specifically declines to draw any conclusions regarding a causal connection between these cancer sites and exposure to nickel. Dr. Miller testified that he would not disagree with Redmond based on what was known in 1983. Since that time, however, further evidence has appeared linking small-cell cancer to specific abnormalities in genetic material. Thus, Dr. Miller agrees with Redmond's refusal to issue causation conclusions for colonic cancers *generally*, but based on pathogenetic similarities of *small-cell* cancers, he disagrees specifically with respect to small-cell cancer.

carcinogenicity is alteration in DNA synthesis. From these findings, Dr. Miller concludes that nickel and cadmium can cause small-cell colon cancer.

b. Christophersen's Exposure

The district court and this *en banc* court have relied heavily upon the notion that the record lacks proof of exposure of Christophersen to toxic fumes. Of course, neither Manoliu nor Dr. Miller know the precise level of that exposure, and the lack of quantified dose and exposure levels could handicap Mrs. Christophersen's case. But this imprecision does not justify exclusion of Dr. Miller's opinion. Seven defense attorneys cross-examined Dr. Miller at length about disputed facts upon which his opinion was based. The questions about exposure raised by our courts were put to Dr. Miller, and his opinion of causation remained unchanged. He readily agreed that dose and exposure levels are important, but his specific conclusion in Christophersen's case rests on sufficient exposure to nickel and cadmium, not precisely known exposure. He testified that his opinion remained valid "as long as the exposure occurred in general as described to me."[7] None of the defendants, including the employer, presented any proof concerning the fumes and dust in the plant, or Christophersen's exposure.

c. Alternative Causation

Dr. Miller considered the various possibilities of alternative causation. Christophersen was not a smoker. Mrs. Christophersen smoked, but Dr. Miller considered this source insufficient for Christophersen's small-cell colon cancer. Nor was Christophersen a heavy drinker. Dr. Miller noted that associations of alcohol and gastrointestinal carcinoma generally occur with chronic alcoholics. Dr. Miller found no evidence of exposure to asbestos, nor was there evidence of hereditary or family associations of small-cell cancer. While evidence exists that diet contributes to the development of adenocarcinomas of the colon, no such evidence links diet to

[7] Pressed by defense attorneys, Dr. Miller said his conclusions would certainly differ if Christophersen had not been exposed to nickel and cadmium. Further pressed, Dr. Miller indicated that his opinion would not change had Christophersen's visits to the soak room occurred for a quarter-hour once every two weeks, but might change if these visits occurred only once a month.

small-cell cancers.[8] Dr. Miller stated that "[d]ifferent types of cancers have different biochemical, cellular characteristics, natural histories and etiologies, and one can't just necessarily lump them like that."

II. Our Prior Jurisprudence

We assign to the trial court the threshold determination of the expert's qualifications, whether the expert's testimony will assist the jury, and whether the facts assumed by the witness as the basis for the opinion are supported in the evidence so as to make that opinion relevant. None of these inquiries warrants exclusion of Dr. Miller's opinion.

A. The Neglected Virtues of the Adversarial System

In a case where the plaintiff claimed that his disease was caused by his toxic work environment, and presented questionable expert medical testimony in support thereof, this circuit declared *en banc* that "it is the function of the jury as the traditional finder of the facts, and not the Court, to weigh conflicting evidence and inferences, and determine the credibility of witnesses." *Boeing Co. v. Shipman*, 411 F.2d 365, 375, 377 (5th Cir. 1969) (en banc) (affirming denial of directed verdict and judgment n.o.v. even "[t]hough the expert medical proof is not entirely reliable in determining the causal connection between Shipman's working conditions and his ailments"). I need not buttress with a string citation this once well-settled proposition. We properly entrust determinations of evidentiary weight and credibility to the jury -- even in "scientific" cases -- because of our faith in the adversarial process.

[8] Dr. John Weisburger submitted a defense report concluding that Christophersen's colon cancer had in fact been caused by a typical American diet. He did not, however, adduce any scientific proof specifically linking small-cell colon cancer to diet. He did note that the association of diet and left-sided (or descending) colon cancer is quite strong, but that the causative elements for right-sided (or ascending) colon cancer -- that Christophersen had -- are not as well defined.

If the evidence is relevant, and not clearly wrong, it goes to jurors, who then "have the benefit of cross-examination and contrary evidence by the opposing party." *Barefoot v. Estelle*, 463 U.S. 880, 898, 103 S.Ct. 3383, 3397, 77 L.Ed.2d 1090 (1983) ("[T]he rules of evidence generally extant at the federal and state levels anticipate that relevant, unprivileged evidence should be admitted and its weight left to the factfinder, who would have the benefit of cross-examination and contrary evidence by the opposing party.").[9] The Supreme Court resolutely championed the adversarial process upon considering the admissibility of psychiatric testimony in predicting future dangerousness. Despite expert testimony -- purportedly representing the "best" clinical research to date -- that the accuracy of such prediction reached no more than one in three, the Court declared:

> All of these professional doubts about the usefulness of psychiatric predictions can be called to the attention of the jury. Petitioner's entire argument ... is founded on the premise that a jury will not be able to separate the wheat from the chaff. We do not share in this low evaluation of the adversary process.[10]

The Federal Rules of Evidence "embody a strong and undeniable preference for admitting any evidence having some potential for assisting the trier of fact and for dealing with the risk of error

[9] *Barefoot* is decided on constitutional grounds, and thus not strictly governed by cases construing the Federal Rules of Evidence, *see* 463 U.S. at 899 n. 6, 103 S.Ct. at 3398 n. 6, but the Court expressly noted that it "perceive[d] no constitutional barrier to applying the *ordinary rules of evidence governing the use of expert testimony*." 463 U.S. at 904, 103 S.Ct. at 3400 (emphasis added).

[10] 463 U.S. at 899 n. 7, 103 S.Ct. at 3398 n. 7; *see also Rock v. Arkansas*, 483 U.S. 44, 61, 107 S.Ct. 2704, 2714, 97 L.Ed.2d 37 (1987) ("Cross-examination, even in the face of a confident defendant, is an effective tool for revealing inconsistencies. Moreover, a jury can be educated to the risks of hypnosis through expert testimony and cautionary instructions."); *In re Paoli R.R. Yard PCB Litig.*, 916 F.2d 829, 856 n. 35 (3d Cir. 1990) (dismissing "out of hand" district court's finding that novel scientific testimony would confuse the jury, which would give it more weight than it deserved because of its scientific nature and doctor's credentials), *cert. denied sub nom. General Electric Co. v. Knight*, — U.S. —, 111 S.Ct. 1584, 113 L.Ed.2d 649 (1991); 3 *Weinstein's Evidence* ¶ 702[2] at 702-30 (1990) ("The jury is intelligent enough, aided by counsel, to ignore what is unhelpful in its deliberations.").

through the adversary process." *DeLuca v. Merrell Dow Pharmaceuticals, Inc.*, 911 F.2d 941, 956 (3d Cir. 1990); *accord In re Paoli*, 916 F.2d at 857 (noting that "in making reliability determinations, courts must err on the side of admission rather than exclusion"). The majority's usurpation of critical evidentiary weight determinations plainly disregards the virtues of the adversarial system and the precedents supporting it.

Courts may, of course, exclude evidence that is patently unreliable and therefore offers no assistance to the jury. The language expressing such patent unreliability varies, but never signals testimony or assumptions that are merely controversial, debatable, questionable, unsettled, or suspicious. These terms connote weight and credibility. Instead, courts speak of testimony that is "almost entirely unreliable,"[11] reliance upon "assumptions devoid of any basis in the real world,"[12] opinions that are "abusive of the known facts"[13] or "contrary to the proven facts,"[14] or so manifestly wrong as to offend common sense.[15] If the record establishes a critical fact contrary to the expert's testimony, or if a court may take judicial notice of a fact that fatally contradicts the assumptions of an expert, then his or her testimony ought to be excluded.[16]

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[11] *Barefoot*, 463 U.S. at 899, 103 S.Ct. at 3398 ("We are not persuaded that such testimony is almost entirely unreliable and that the factfinder and the adversary system will not be competent to uncover, recognize, and take due account of its shortcomings.").

[12] *Douglass v. Delta Air Lines, Inc.*, 897 F.2d 1336, 1343 (5th Cir. 1990).

[13] *In re Air Crash Disaster*, 795 F.2d at 1235.

[14] *Georgia Kaolin International v. M/V Grand Justice*, 644 F.2d 412, 417 (5th Cir. Unit B 1981).

[15] *Osburn v. Anchor Laboratories, Inc.*, 825 F.2d 908, 915 n. 10 (5th Cir. 1987) (deference to controversial opinion would not extend to denial of gravity or pure theoretical speculation), *cert. denied*, 485 U.S. 1009, 108 S.Ct. 1476, 99 L.Ed.2d 705 (1988); *Crinkley v. Holiday Inns, Inc.*, 844 F.2d 156, 164 n. 2 (4th Cir. 1988) (experts' medical opinions "cannot be said to be manifestly incredible as physical fact within common lay knowledge"); *Drayton v. Jiffee Chem. Corp.*, 591 F.2d 352, 364 (6th Cir. 1978) ("no reasonable person would, in the ordinary affairs of life, act upon the astronomical projections and assumptions made by plaintiffs' expert").

[16] *See* C. McCormick, *Handbook Of The Law Of Evidence* § 203 at 491 (2d ed. 1972) ("'General scientific acceptance' is a proper condition for taking judicial notice of scientific facts, but not a criterion for the admissibility of scientific

No such infirmity warrants exclusion of Dr. Miller's testimony. Nor do defendants present any wealth of contrary evidence, of the sort that produced the Agent Orange[17] decision often cited for a restrictive view of admissibility. Compared to substantial research and experimentation conducted on Agent Orange, the accumulated knowledge -- through traditional methods -- of the relationship between nickel, cadmium, and small-cell colon cancer is scant.[18]

The causation issue is plainly not sufficiently investigated to warrant summary proceedings based on direct judicial precedent or judicial acknowledgement of decisive negative findings. No clearly established facts in the record controvert the scientific facts informing Dr. Miller's reasoning: the carcinogenicity of nickel and cadmium and their capacity to reach the colon; the unique characteristics of small-cell carcinoma and its relative rarity in the colon;[19]

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evidence. Any relevant conclusions which are supported by a qualified expert witness should be received unless there are other reasons for exclusion.").

[17] "[Y]ears of discovery and tens of millions of dollars spent by the government and others on research has not yielded any competent evidence indicating a genuine issue of fact about causation." *In re "Agent Orange" Prod. Liab. Litig.*, 611 F.Supp. 1223, 1260 (E.D.N.Y. 1985), *aff'd on other grounds*, 818 F.2d 187 (2d Cir. 1987) (affirming on basis of government contractor defense without reaching any evidentiary questions addressed by district court), *cert. denied sub nom. Lombardi v. Dow Chem. Co.*, 487 U.S. 1234, 108 S.Ct. 2898, 101 L.Ed.2d 932 (1988).

[18] *See Ferebee v. Chevron Chem. Co.*, 736 F.2d 1529, 1534 (D.C. Cir.) ("On questions [of toxic exposure] such as these, which stand at the frontier of current medical and epidemiological inquiry, if experts are willing to testify that such a link exists, it is for the jury to decide whether to credit such testimony."), *cert. denied*, 469 U.S. 1062, 105 S.Ct. 545, 83 L.Ed.2d 432 (1984).

[19] The rarity of small-cell colon cancer creates virtually insurmountable obstacles to statistically significant epidemiological studies. Accordingly, the majority regimen creates virtually insurmountable obstacles to claimants suffering from rare or new diseases. *See Note, Trans-Science in Torts*, 96 Yale L.J. 428, 429 (1986) ("Scientific quantification requires both that an epidemiological study be conducted, a highly expensive and time-consuming undertaking, and that the study be successful in distinguishing injuries caused by the product from those induced by the general environment."). The population has many times been exposed to known health hazards -- with consequent injuries such as adenocarcinoma, pelvic inflammatory disease, toxic shock syndrome, and Guillain-Barre Syndrome -- but a rigid alliance between law and epidemiology conspired to prevent recovery until a "statistically significant" number of deaths and injuries occurred. *Id.* at 428-29. Since the plaintiff in any event bears the burden of persuasion, and since the "more probable than not" causation standard already forces victims to bear significant

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the linkage of small-cell carcinoma to toxins such as nickel and cadmium; and the genetic-alteration mechanism associated with both small-cell carcinoma and nickel and cadmium.

To dispatch the controversial question of causation, the district court simplistically characterized Dr. Miller's testimony as grounded exclusively in similar cell appearance, and simply chose to believe the opposing experts who issued broad and incomplete rebuffs of Dr. Miller's analysis. *Cf. In re Paoli*, 916 F.2d at 858 (district court made improper credibility judgment in choosing to "believe[] defendants' experts that ... meta-analysis was not reliable, and disbelieve[] plaintiffs' experts who said that it was"). For this arrogation of weight and credibility determinations, the district court and the majority enjoy the force of neither precedent nor principle. Whether Dr. Miller's testimony would prevail as proof of causation belongs to the jury.

To the foregoing, it may be countered that a "battle of experts" on a point of hard science demands the impossible from a lay jury. If the experts cannot agree, the argument goes, how can we expect a jury to resolve the question?[20] Yet by our charge to the jury,[21] we routinely entrust difficult determinations to jurors that assume their possession and use of critical capacities.[22] Indeed, the

losses without recompense, those cases adopting a less stringent view of scientific proof surely promote the more enlightened and humane view of tort law. *See id.* at 436-37 & n. 45.

[20] The majority opinion advances this argument by citation to the 1901 Harvard Law Review quotation of Learned Hand.

[21] The charge reads: "You should consider each expert opinion received in evidence in this case, and give it such weight as you may think it deserves. If you should decide that the opinion of an expert witness is not based on sufficient education and experience, *or if you should conclude that the reasons given in support of the opinion are not sound*, or if you feel that it is outweighed by other evidence, you may disregard the opinion entirely." *Federal Jury Practice and Instructions:* Civil § 72.08 (West 4th ed. 1987) (emphasis added). *See Dixon v. International Harvester Co.*, 754 F.2d 573, 580 (5th Cir. 1985) (once a witness is "properly admitted as an expert, the jury [is] at liberty to accept or reject his testimony, and to judge his credibility").

[22] "The effect of volatile organic compounds on the human body is a subtle, complex matter. It is for the trier of fact, aided by expert testimony, to determine whether plaintiffs have suffered present harm." *Werlein v. United States*, 746 F.Supp. 887, 901 (D. Minn. 1990) (following Christophersen panel and disagreeing with *Brock* concerning necessity of epidemiological proof); *see also Shanks v.*

argument simply acknowledges the mandate of our legal system: to resolve conflicts, even seemingly intractable conflicts, from which we cannot retreat when parties invoke the machinery of the legal system. In this sense, the jury represents neither the ideal arbitration of scientific conflict, nor its permanent resolution, but simply the essential voice of the community in solving one problem fairly brought before it.[23] Let the experts settle the larger dispute in due time; we have cases to resolve.

In this case, we do not demand of a jury any exotic sophistication. The medical explanations may employ unfamiliar terms, but the resolution of the evidentiary conflict demands only attentive common sense. With its deference to summary rendering of *Christophersen*, the majority endows judges with the work of juries.

B. Current Ways of Taking Hold Without Taking Over

Particular trials beget particular needs. Judges with concerns about scientific evidence have at their disposal many mechanisms that do not distort the Federal Rules of Evidence, such as appointing (or allowing the parties to negotiate for) neutral experts to assist in comprehending complex issues,[24] referring issues to special masters, employing technical advisors, presiding over pretrial colloquia with experts to clarify issues and narrow disagreements,

State, 185 Md. 437, 45 A.2d 85, 90 (1945) ("Judges and juries must be presumed to have average intelligence at least, and no assumption to the contrary can be made for the purpose of excluding otherwise admissible testimony.").

[23] "So long as the Seventh Amendment stands, the right to a jury trial should not be rationed, nor should particular issues in particular types of cases be treated differently from similar issues in other types of cases." *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1547 (Fed. Cir. 1983).

[24] *See* Fed.R.Evid. 706; *Gates v. United States*, 707 F.2d 1141, 1144 (10th Cir. 1983) (per curiam) (trial court has broad discretion in regulating trial procedure, including appointment of expert panel to assist in understanding complex matters); *Students of Cal. School for the Blind v. Honig*, 736 F.2d 538, 548-49 (9th Cir. 1984) (no abuse of discretion to appoint expert without consent of parties), *vacated on other grounds*, 471 U.S. 148, 105 S.Ct. 1820, 85 L.Ed.2d 114 (1985). The concept of a court-appointed expert was first suggested by Judge Learned Hand, in the 1901 Harvard Law Review article cited by the majority for the proposition that "expert testimony creates the risk of a special kind of prejudice."

requiring experts to follow certain protocols,[25] providing jurors with glossaries, allowing civil jurors to question experts, issuing special instructions to eliminate some of the mystery of technical issues,[26] or bifurcating the trial to resolve the issue of causation without exploring conduct or damages.[27]

If current mechanisms prove inadequate to the general problem perceived by the majority, it remains the duty of courts to follow either precedent or the proper procedures of reform.[28] The American Law Institute, for example, is presently considering a proposal for "Blue Ribbon Science Panels" and a "Federal Science Board" to assist courts in the disposition of scientific questions.[29]

The majority regimen short-circuits present mechanisms and proposals for modest reform by effectively converting judicial chambers into science star chambers. We need practical approaches to the intersection of law and science, not disguised control that skews the system toward exclusion of otherwise relevant evidence.

III. Rule 703: To Err is Inadmissible

The district court analyzed Dr. Miller's "methodology" under Rule 703, which neither the Federal Rules nor the majority opinion sanctions. The language of Rule 703 governs an expert's use of "facts or data ... of a type reasonably relied upon by experts," not an expert's opinion or "methodology."[30] This misapprehension of

[25] *See* M. Berger, in *Symposium on Science and Rules of Evidence*, 99 F.R.D. 187, 232 (1983).

[26] *See* A. Moenssens, in *Symposium on Science and Rules of Evidence*, 99 F.R.D. 187, 231 (1983) (advocating abandonment of *Frye* and possibility of special instruction with "clear explanations of the uncertainties about the evidence and of the opposing views concerning its validity").

[27] *See* Fed.R.Civ.Proc. 42(b); W. Schwarzer, *Reforming Jury Trials*, 132 F.R.D. 575, 594-95 (1991).

[28] *See, e.g., Proposals for a Model Rule on Admissibility of Scientific Evidence*, 115 F.R.D. 79 (1986) (elaborating four proposals for amendment of Rule 702).

[29] *See* A.L.I. Reporters' Study, Enterprise Responsibility for Personal Injury, "Scientific and Legal Causation" Vol. II, ch. 11 at p. 335-50 (1991).

[30] "Rule 703 is satisfied once there is a showing that an expert's testimony is based on the type of data a reasonable expert in the field would use in rendering an opinion on the subject at issue; it does not address the reliability or general acceptance of an expert's methodology." *DeLuca*, 911 F.2d at 953; *accord In re Paoli*, 916 F.2d at 856 (when scientist's technique or methodology attacked, in contrast to data relied on, court must analyze reliability under Rule 702).

Rule 703's scope does not justify the majority's magnanimous deference to the district court's ruling.[31] Yet the majority merely refurbishes that erroneous framework, shifting the district court's Rule 703 analysis to the *Frye* rubric, and then, alluding to its limited scope of review, generously infers that the district court's inaccurate and incomplete portrayal of Dr. Miller's testimony was "sufficiently broad to be understood as rejecting Dr. Miller's methodology."

The majority opinion quietly corrects the district court's misuse of Rule 703, but in holding that the district court did not abuse its discretion in rejecting Dr. Miller's reliance on "critically inaccurate or incomplete" data, the majority commits error of its own. The majority emphasizes that Dr. Miller's information on Christophersen's exposure to nickel and cadmium came from the Manoliu affidavit, which did not precisely quantify dose and exposure levels.[32] Further, my colleagues seem impressed by the allusion in Dr. Miller's affidavit to twenty years of exposure, while Manoliu's affidavit establishes that Christophersen's exposure at the

[31] *See In re Japanese Electronic Products Antitrust Litigation*, 723 F.2d 238, 278 (3d Cir. 1983) ("review must be more discriminating if we believe that the court's exercise of discretion proceeded under a misapprehension as to the meaning of the governing rules"), *rev'd on other grounds sub nom. Matsushita Electric Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 106 S.Ct. 1348, 89 L.Ed.2d 538 (1986); *Leonard v. Dixie Well Service & Supply, Inc.*, 828 F.2d 291, 294 (5th Cir. 1987) ("The Supreme Court has not, however, approved summary judgments that rest on credibility determinations.... The district judge erred in basing his decision on finding Dixie Well's documentary evidence inherently more 'reliable' or 'accurate' than Leonard's and his co-workers' testimony and sworn statements from memory."); *Bailey v. Kawasaki-Kisen, K.K.*, 455 F.2d 392, 398 (5th Cir. 1972) ("This discretionary power does not, however, allow the Trial Court to exclude competent evidence which is essential and vital to a litigant's case unless there is a sound practicable reason for barring it.").

[32] The majority's observation -- that the "district court criticized the [Manoliu] affidavit ... as being inaccurate and incomplete" -- is itself inaccurate. The district court noted twice that the affidavit lacked any mention "of the level of fumes or airborne particles," but did not otherwise "criticize" the affidavit, and certainly found nothing "inaccurate" therein.

Waco plant lasted a mere fourteen years.[33] These defects make marvelous trial arguments, but badly mistaken bases for exclusion under Rule 703.

An expert may base an opinion on "facts or data" otherwise inadmissible, if "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences on the subject."[34] Courts properly defer "to the expert's view that experts in his field reasonably rely on such sources of information." *Greenwood Utilities Comm'n v. Mississippi Power Co.*, 751 F.2d 1484, 1495 (5th Cir. 1985); *see also In re Japanese Electronic Products*, 723 F.2d at 277 (district court misinterpreted Rule 703 by "substituting its own opinion as to what constitutes reasonable reliance"). The district court's erroneous invalidation of Dr. Miller's opinion -- based upon deficiencies that Dr. Miller expressly considered and dispatched in his deposition -- exceeds the plain language of Rule 703 and the deference due an expert's reliance on chosen facts and data. The ten cases string-cited by the majority do not suggest a different interpretation. These patently distinguishable cases all address questions of evidentiary *sufficiency* rather than admissibility,[35] or circumstances of plain incompetence to testify to the

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[33] Dr. Miller's allusion to a 20-year-history of exposure relates to the duration of Christophersen's employment with Marathon. Christophersen worked at a Marathon plant located in New York from 1966 to 1972, and moved to the Waco plant in 1972. Dr. Miller makes plain in his deposition, however, that his causation conclusion rests upon the 14-year exposure at the Waco plant, and that Christophersen's exposure at the New York plant had been, according to his information, "very substantially less."

[34] Fed.R.Evid. 703. The plain language of the rule casts doubt on the majority's gloss. Facts or data "of a type reasonably relied upon by experts in the particular field" are not invariably "the same type as are relied upon by other experts in the field." The difference is subtle, but an expert might "reasonably" rely on types of facts or data that are not -- or not yet -- exactly the "same" type as are relied upon by other experts. In other words, the majority gloss essentially expunges the word "reasonably."

[35] *Brock*, 874 F.2d at 313-15 (finding causation evidence insufficient based on purportedly overwhelming negative epidemiological evidence); *Osburn*, 825 F.2d at 915-16 (no mention of Rule 703 and no challenge to admissibility; affirming jury verdict for plaintiff, rejecting challenge of evidentiary sufficiency, and acknowledging that plaintiffs' experts employed customary methodologies in reaching their admittedly controversial conclusions); *Thompson v. Southern Pacific Transp. Co.*, 809 F.2d 1167, 1169 (5th Cir.) (no discussion of admissibility; reversing jury verdict for plaintiff whose experts failed to produce sufficient evidence of

pertinent issue,[36] or reliance on critical facts contrary to established facts.[37]

Three possibilities occur here, and none eliminates Dr. Miller's opinion at the summary judgment stage. First, if the record shows that Dr. Miller based his opinion on critical assumed facts that do

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causation, and noting that three physicians who had treated plaintiff testified that alcohol consumption rather than toxic exposure caused plaintiff's illness), *cert. denied*, 484 U.S. 819, 108 S.Ct. 76, 98 L.Ed.2d 38 (1987).

[36] *Brown v. Parker-Hannifin Corp.*, 919 F.2d 308, 311-12 (5th Cir. 1990) (affirming directed verdict and exclusion of testimony of expert willing to speculate about two possible causes of mechanical failure without any basis for ruling out equally plausible alternative causes); *Edmonds v. Illinois Central Gulf R.R. Co.*, 910 F.2d 1284, 1286-87 (5th Cir. 1990) (holding that a clinical psychologist, who was not a medical doctor, did not conduct any medical tests, made no medical diagnosis, and relied only on generic studies suggesting a link between stress and illness but could not relate the studies to the facts of the case, could not testify as to medical causation); *Washington v. Armstrong World Indus., Inc.*, 839 F.2d 1121, 1123-24 (5th Cir. 1988) (affirming exclusion of speculative causation-testimony of doctor who did not examine patient and "merely relied on examinations performed by [three] other physicians who reached different conclusions"); *Viterbo*, 826 F.2d at 423 (expert's exclusive reliance on patient's oral medical history fatally defective because expert unaware of plaintiff's extensive "family history of depression and hypertension" and plaintiff "was experiencing symptoms characteristic of depression and hypertension" which expert admitted were symptoms linked with a host of potential causes); *Soden v. Freightliner Corp.*, 714 F.2d 498, 503-05 (5th Cir. 1983) (affirming exclusion of opinion testimony based on accident statistics prepared strictly in anticipation of litigation by a sister company, memorialized only in an informal letter, without any indication of the method for deriving the statistics; opposing party had introduced evidence casting serious doubt on exactly what the statistics represented, and the party proffering the statistics-based testimony failed to provide the opposing party with the statistical information until trial despite repeated discovery requests; expert had not even examined the statistics himself, but instead relied on a summary).

Significantly, the *Soden* court rejected the argument that cross-examination could have disclosed any weakness of the proffered opinion testimony only because the originator of statistics "was not available for cross-examination," and because the expert testifying could not be examined on the reports because "they were not available and he had not examined them." 714 F.2d at 506-07.

[37] *Slaughter v. Southern Talc Co.*, 919 F.2d 304, 307 (5th Cir. 1990) (affirming partial summary judgment, and expressly distinguishing *Christophersen* panel opinion, because reports that informed experts' opinions were never submitted as summary judgment evidence, and were "replete with so many obvious errors as to be of no value to the trier of fact" and thus "nothing more than bare conclusions derived from erroneous data"); *In re Air Crash Disaster*, 795 F.2d at 1233, 1235 (economist's assumptions underlying projection of future income "completely airborn[e]," "without basis in the real world" of plaintiffs, and "abusive of the known facts").

not exist in Christophersen's case, then the opinion is irrelevant. The proffered evidence runs afoul of Rule 401 as well as Rule 702, rather than Rule 703. But this record does not discredit the factual basis for Dr. Miller's opinion. Second, if we have a factual dispute as to the nature of Christophersen's exposure and whether it suffices for what Dr. Miller requires to justify his opinion, the opinion is conditionally relevant. But that dispute goes to the jury under Rule 104(b), not to the judge. Third, if Dr. Miller and the defense experts disagree on the extent of exposure required to cause cancer, we simply have a question of fact to be weighed and decided by the trier of facts.

If the district court or the majority feels that Dr. Miller's reliance on imprecise dose and exposure levels rendered his opinion tenuous, then our cases dictate the procedure to follow: "It is the jury's province to determine whether expert testimony rests upon tenuous evidentiary inferences and weak scientific or engineering data." *Mitchell v. Lone Star Ammunition, Inc.*, 913 F.2d 242, 252 (5th Cir. 1990). No record evidence establishes that precise dose and exposure quantification *must* precede any causation opinion, only that such precision helps. If there be weakness in his reliance on imprecise data, the determination belongs to the jury.[38] The district court's ruling to the contrary was manifestly erroneous.

[38] *See Garnac Grain Co. v. Blackley*, 932 F.2d 1563, 1567 (8th Cir. 1991) ("Perhaps the combined weaknesses of Howard Stettler's methodology and qualifications would lead us to discount his opinion if we were jurors. But we are not jurors."); *Wilson v. Merrell Dow Pharmaceuticals, Inc.*, 893 F.2d 1149, 1154 (10th Cir. 1990) ("this failure of the charts to take into account when the Bendectin was consumed may weaken their value as the basis for expert testimony, but this failure affects the *weight*, not the admissibility, of the charts under Rule 703) (emphasis in original), *citing Bazemore v. Friday*, 478 U.S. 385, 400, 106 S.Ct. 3000, 3009, 92 L.Ed.2d 315 (1986) (noting that failure of a regression analysis to include other variables that may affect the salary level of a Title VII plaintiff will normally "affect the analysis' probativeness, not its admissibility"); *Payton v. Abbott Labs*, 780 F.2d 147, 156 (1st Cir. 1985) (fact that defendant undercut research basis and weakened factual underpinnings of doctor's opinion affected weight and credibility, not admissibility).

IV. Comes *Frye* and Methodology

This circuit has continued to apply the rule of *Frye v. United States*[39] to determine admissibility of polygraph examinations, post-hypnotic testimony, and voice stress analysis.[40] Now the Fifth Circuit, without precedent, reaches beyond novel device or technique and subjects expert reasoning to judge-determined reliability.

While the Fifth Circuit has never joined the chorus of *Frye* detractors,[41] the six Fifth Circuit cases that actually cite *Frye*

[39] 293 F. 1013, 1014 (D.C. Cir. 1923) ("[W]hile courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, *the thing from which the deduction is made* must be sufficiently established to have gained general acceptance in the particular field in which it belongs.") (emphasis added). *Frye* held inadmissible a crude polygraph prototype that only measured systolic blood pressure. *See United States v. Piccinonna*, 885 F.2d 1529, 1531 (11th Cir. 1989) (en banc) (*Frye* standard invoked only sporadically, except in polygraph cases); *People v. McDonald*, 37 Cal.3d 351, 208 Cal.Rptr. 236, 690 P.2d 709 (1984) (observing that *Frye* standard applies "primarily in cases involving novel devices or processes such as lie detectors, 'truth serum,' Naline testing, experimental systems of blood typing, 'voiceprints,' identification by human bite marks, microscopic analysis of gunshot residue, and hypnosis").

[40] *Barrel of Fun, Inc. v. State Farm Fire & Cas. Co.*, 739 F.2d 1028, 1031 n. 9 (5th Cir. 1984) ("Although this Court has noted that it is an 'unresolved question whether the Federal Rules of Evidence silently abolished or adopted the *Frye* test,' *United States v. Valdez*, 722 F.2d 1196, 1201 (5th Cir. 1984), we have continued to utilize *Frye*'s 'general scientific acceptability' [sic] criteria. While the *Barrel of Fun* court perhaps intended no significant semantic shift, [illegible] obvious difference between "general scientific *acceptability*" and general scientific *acceptance*.

[41] Besides the voluminous commentary and case law criticizing the *Frye* doctrine, a significant debate continues over whether the adoption of the Federal Rules of Evidence abolished *Frye*. "Rule 702's failure to incorporate a general scientific acceptance standard, and the Advisory Committee Note's failure to even mention the *Frye* case must be considered significant. The silence of the rule and its drafters may arguably be regarded as tantamount to an abandonment of the general acceptance standard. Elimination of the *Frye* test is consistent with the underlying policies of Article VII." J. Weinstein & M. Berger, *3 Weinstein's Evidence*, ¶ 702[03] at 702-36 (1990); *see also United States v. Williams*, 583 F.2d 1194, 1198 (2d Cir. 1978) ("scientific voting pattern" irrelevant to court's reliability inquiry), *cert. denied*, 439 U.S. 1117, 99 S.Ct. 1025, 59 L.Ed.2d 77 (1979); *United States v. Downing*, 753 F.2d 1224, 1236-37 (3d Cir. 1985) (analyzing "serious flaws" of *Frye* test, and finding its "conservative approach to the admissibility of scientific evidence" contrary to the spirit of the Federal Rules); *United States v. Baller*, 519

signify the limited purpose of that case.[42] We have only once employed *Frye* outside the criminal context,[43] never applied it to "reasoning," and indeed once expressly limited the *Frye* doctrine to "pseudo-scientific data."[44]

Until today, we soundly limited the *Frye* doctrine to particular

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F.2d 463, 466 (4th Cir.) ("Unless an exaggerated popular opinion of the accuracy of a particular technique makes its use prejudicial or likely to mislead the jury, it is better to admit relevant scientific evidence in the same manner as other expert testimony and allow its weight to be attacked by cross-examination and refutation."), *cert. denied*, 423 U.S. 1019, 96 S.Ct. 456, 46 L.Ed.2d 391 (1975).

The Supreme Court has not ruled on whether enactment of the Federal Rules of Evidence implicitly overruled *Frye*, or incorporated it. *See United States v. Mustafa*, 22 M.J. 165 (C.M.A.) (holding that enactment of Federal Rules superseded *Frye* test), *cert. denied*, 479 U.S. 953, 107 S.Ct. 444, 444-45, 93 L.Ed.2d 392 (1986) (White, J., & Brennan, J., dissenting) (noting need to resolve conflict in circuits over whether Rule 702 superseded or incorporated *Frye*).

The Supreme Court has, however, championed the adversarial process against barriers to admissibility of relevant evidence, and adopted a plain-meaning standard for interpreting the Federal Rules of Evidence that yields no support for a *Frye* penumbra. *See* R. Jonakait, *The Supreme Court, Plain Meaning, and the Changed Rules of Evidence*, 68 Tex.L.Rev. 745, 764-67 (1990) (acknowledging that Supreme Court's adoption of the Plain Meaning Standard effectively abolishes *Frye*); *see also* E. Imwinkelried, *Federal Rule of Evidence 402: The Second Revolution*," 6 Rev. of Litig. 129 (1987) (analyzing Rule 402's general abolition of common-law barriers to admissibility, including *Frye*, that are not reduced to statute).

[42] *Brock v. Merrell Dow Pharmaceuticals, Inc.*, 884 F.2d 167, 169 n. 2 (5th Cir. 1989) (Higginbotham, J., dissenting from denial of rehearing *en banc*, noting *Frye* in purely informational context); *Barrel of Fun*, 739 F.2d at 1031 & n. 9 (holding voice stress analysis technique inadmissible); *United States v. Valdez*, 722 F.2d at 1200 (post-hypnotic testimony admissible); *United States v. Clark*, 622 F.2d 917 (5th Cir.1980) (vacating order granting rehearing *en banc* on polygraph testimony case), *cert. denied*, 449 U.S. 1128, 101 S.Ct. 949, 67 L.Ed.2d 116 (1981); *United States v. Cochran*, 499 F.2d 380, 393 (5th Cir. 1974) (polygraph), *cert. denied*, 419 U.S. 1124, 95 S.Ct. 810, 42 L.Ed.2d 825 (1975); *United States v. Frogge*, 476 F.2d 969, 970 (5th Cir.) (polygraph), *cert. denied*, 414 U.S. 849, 94 S.Ct. 138, 38 L.Ed.2d 97 (1973).

[43] *See Barrel of Fun*, 739 F.2d at 1031-32 & n. 9 (holding voice stress analysis technique inadmissible and relying on numerous criminal cases declaring the technique unreliable); *see also* P. Giannelli & P. Fuller, in *Symposium on Science and Rules of Evidence*, 99 F.R.D. 187, 219 (1983) (noting differences in criminal and civil cases that might justify *Frye* test in former but not latter).

[44] *Valdez*, 722 F.2d at 1201 n. 19 ("We nevertheless decline to apply a test designed for pseudo-scientific data in a manner that would render a lay witness incompetent to give previously admissible testimony.").

techniques, "novel scientific evidence,"[45] that reflect the factual context of *Frye*. To my knowledge, the Fifth Circuit has never excluded otherwise relevant evidence strictly on the basis of lack of general scientific acceptance. To do so would impose a significantly heavier burden of proof and persuasion on the offering party. *See Peteet v. Dow Chem. Co.*, 868 F.2d 1428, 1433 (5th Cir. 1989) ("[T]he absence of a scientific consensus on a given theory does not affect the admissibility of an expert's opinion."), *cert. denied*, — U.S. —, 110 S.Ct. 328, 107 L.Ed.2d 318 (1990); *Osburn*, 825 F.2d at 915 (expert's opinion need not be generally accepted in scientific community to be sufficiently reliable and probative).

The district court of course did not cite to *Frye* or employ any kind of *Frye* analysis. The doctrine is doubtless alien to it in such a context. But the majority found that "the district court was within its discretion in concluding, albeit implicitly, that Dr. Miller's testimony failed to meet the third threshold test, the *Frye* test." How did they get there? I do not know, but they speak of "methodology."

If his study and the reasons for his opinion are Dr. Miller's "methodology," nothing distinguishes his methods from those of other experts. He examined the available information and literature, applied his experience and education, and gave an opinion with his reasons. If his reasons are his methodology, then here it is: (1) Christophersen had small-cell colon cancer that metastasized to his liver; (2) nickel and cadmium cause cancer; (3) some evidence suggests that nickel and cadmium act synergistically to produce cancer; (4) medical science *so far* has established specific links to lung, prostate, and renal cancers; (5) small-cell carcinoma appears to be the same cell (identical histology) regardless of its location in

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[45] *See United States v. Hadley*, 918 F.2d 848, 853 (9th Cir. 1990) (holding *Frye* inapplicable where doctor's testimony was not based on "novel scientific evidence" and "did not employ any special techniques or models").

The Third Circuit rejected the *Frye* test in *United States v. Downing*, 753 F.2d 1224, 1237 (3d Cir. 1985), and adopted instead a three-part test for analyzing "novel scientific evidence," which it defined as "evidence whose scientific fundaments are not suitable candidates for judicial notice": (1) the soundness and reliability of the process or technique used in generating the evidence; (2) the possibility that admitting the evidence would overwhelm, confuse, or mislead the jury; and (3) the proffered connection between the scientific research or test result to be presented, and particular disputed factual issues in the case.

the body; (6) one of the physicians who examined Christophersen's colon biopsy material believed it was virtually identical to tumors of lung origin; (7) substances designated as "tumor promoters" are associated with a wide range of cancers, and there is some evidence that nickel is a tumor promoter; (8) one mechanism of nickel and cadmium carcinogenicity is alteration in DNA synthesis; (9) medical evidence relates small-cell cancer to abnormal alterations of genetic material; and (10) small-cell carcinomas, which are quite rare, are associated with toxic exposures.

None of the foregoing propositions abuses facts known to the district court or the majority. None is contrary to established scientific knowledge. Nor do we know specific cancers invariably associated with nickel and cadmium, or specific causes invariably associated with small-cell cancer.[46] The only evidence in the record to substantiate the majority's *Frye* holding is the contrary conclusion of the defense experts, who do not even address critical aspects of Dr. Miller's disputed "methodology." And even had they refuted his reasoning with withering particularity, upon what basis can this majority infer the lack of "general acceptance," especially when the district court did not even address that issue? Are the affidavits of experts hired by the defense conclusive proof of "general acceptance"? Thus does the majority manage to introduce a new regimen, and simultaneously provide a case-study of its mischievous abuse.

"[T]his case involves a situation where science has some meaningful information but scientific 'truth' has not so completely hardened as to prevent legitimate difference of true expert opinion in a particular concrete context." *Osburn*, 825 F.2d at 915 & n. 10 (rejecting argument that testimony of leukemia victim's experts should have been excluded because it conflicted with widely-held theory that chloramphenicol cannot cause leukemia without first causing aplastic anemia, which plaintiff never had). Our tradition, our cases, and our rules properly deliver this case to the jury. It is pretense to say that rules and precedent support the per curiam opinion, to claim that it is consistent with the rights of Mrs.

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[46] Benzene, for example, causes a certain kind of leukemia and no other cancer. The vinyl chloride in reactor cleaners causes a specific kind of liver cancer and no other. Conversely, certain specific diseases typically trace back to specifically-known causes, such as asbestos and mesothelioma.

Christophersen under the Seventh Amendment and Texas law, or to say that it is anything other than judicial fact-finding.

V. Then There is Rule 403

Chief Judge Clark identifies the *per curiam* errors on Rules 702 and 703 but then does greater mischief with Rule 403. He misreads this record and misuses Rule 403.

Judge Clark writes that the "undisputed record" disproves Dr. Miller's factual assumptions. If that were so, Dr. Miller's opinion about facts unrelated to this case would not be relevant. And the opinion would not assist the fact finder. As I have said above, the opinion would be excluded under settled law. But how does this record disprove Dr. Miller's assumptions about Christophersen's exposure to toxic fumes? And how can Judge Clark enshrine as established fact that Dr. Miller delivered his opinion "without any accurate information on Christophersen's exposure"? One fact is truly uncontradicted: Christophersen was regularly exposed to the fumes and dust of this nickel-cadmium battery plant for over 13 years. Dr. Miller said he had enough information to support his causation opinion. That is the state of the record. By what rule or reason do we leap to judgment?

True, defense attorneys confronted Dr. Miller with all varieties of skepticism about Christophersen's exposure. But Judge Clark discloses his chosen result by converting defense attorney skepticism into the "*fact* that [Dr. Miller] formed his opinion without any credible exposure data." Then Judge Clark caricatures Dr. Miller as a man oblivious to conflicting evidence. Dr. Miller maintained that Christophersen's exposure was sufficient to cause, and in his opinion did cause, Christophersen's cancer and death. He did not say his opinion would be different only if there were *no* nickel and cadmium fumes; he simply stated that he might change his opinion if Christophersen had visited the soak room only once a month, and that his conclusion would certainly be different if there had been no exposure to toxic fumes.

The causal connection between these toxic agents and small-cell colon cancer is disputed. The ordinary routes of epidemiology, animal studies, and *in vitro* studies establish the carcinogenicity of nickel and cadmium, but do not yet resolve with scientific certainty

– one way or the other – the link between these carcinogens and the rare small-cell colon cancer. My colleagues presume the lack of connection and predicate summary judgment on that judicial presumption. They disregard the different standards of law and science. Courts do not require scientific certainty. An opinion about probability suffices. The fact issue stands.

If Judge Clark would override that fact issue with Rule 403, he fashions a rule with the following new and drastic effect. Judges may weigh contradictory evidence and exclude *any* proffered evidence considered unreliable. The judge's opinion about the contested evidence determines unreliability. The force of the proffered evidence on the very point at issue becomes the prejudice.

The advisory committee notes to Rule 403 define "unfair prejudice" as "an undue tendency to suggest decision on an improper basis." What is the improper basis or prejudice here, unless a judge simply assumes that Dr. Miller is wrong and the defendants' affiants are right? That assumption has not been a predicate in the past for Rule 403 exclusion. *See Dollar v. Long Mfg., N.C. Inc.*, 561 F.2d 613, 618 (5th Cir. 1977), *cert. denied*, 435 U.S. 996, 98 S.Ct. 1648, 56 L.Ed.2d 85 (1978). We have viewed Rule 403 as an extraordinary remedy to be used cautiously and sparingly. *United States v. McRae*, 593 F.2d 700, 707 (5th Cir.), *cert. denied*, 444 U.S. 862, 100 S.Ct. 128, 62 L.Ed.2d 83 (1979); *United States v. Thevis*, 665 F.2d 616, 633 (5th Cir. Unit B), *cert. denied*, 459 U.S. 825, 103 S.Ct. 57, 74 L.Ed.2d 61 (1982). Others have agreed. *United States v. Cross*, 928 F.2d 1030, 1048 (11th Cir. 1991) ("The 'major function' of Rule 403 is 'limited to excluding matter of scant or cumulative probative force, dragged in by the heels for the sake of its prejudicial effect.'") (quoting Thevis and McRae); *DeLuca*, 911 F.2d at 957 (if "testimony survives the rigors of Rules 702 and 703 ..., Rule 403 is an unlikely basis for exclusion.").

My colleagues of the concurrence and the majority, by one path or another, invite judges to decide the reliability and relative merit of conflicting expert opinions.

VI. And There Was *Erie*

By ordering judicial review of expert opinion supporting the claims of injured parties, and requiring general scientific acceptance as a condition of admissibility, as this court now does, and by rejecting a mass of compelling expert testimony, as the court did in *Brock*,[47] we substantially affect the rights of claimants and the proof required for their compensation. Only diversity jurisdiction opens the federal courts to these cases, and state law properly controls. Under Texas law, claimants do not suffer these disadvantages.[48] There can be no doubt that in Texas courts Mrs. Christophersen would have received her jury trial and the Brocks would have recovered their judgment.[49] Reflexive citation to the general proposition that federal law governs evidentiary questions does not settle this issue. The Federal Rules' Enabling Act establishes that federal "rules shall not abridge, enlarge or modify any substantive right." 28 U.S.C.A. § 2072(b) (West Supp. 1991). The rules set forth in the *per curiam* opinion sharply curtail claimants' substantive

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[47] *See Brock v. Merrell Dow Pharmaceuticals, Inc.*, 884 F.2d 167, 168 (5th Cir. 1989) (Reavley, J., dissenting from denial of rehearing *en banc*).

[48] *See, e.g., Lenger v. Physician's General Hosp., Inc.*, 455 S.W.2d 703, 707 (Tex. 1970) (holding it error to exclude doctor's testimony of possible cause because "[e]xpert testimony concerning the possible causes of the condition in question will often assist the trier of fact in evaluating other evidence in the case.").

Texas courts in civil contexts have never cited *Frye* and do not employ a "general acceptance" test for expert testimony. The aporadic citation to *Frye* in criminal cases invariably involves novel scientific techniques that reflect the factual context of *Frye*, and the evidence usually gets in. *See, e.g., Spence v. State*, 795 S.W.2d 743, 752 (Tex.Crim.App. 1990) (bite-mark evidence admissible; lack of expert agreement on minimum number of concordant points goes to weight and not admissibility), *cert. denied*, — U.S. —, 111 S.Ct. 1339, 113 L.Ed.2d 271 (1991). In fact, even in the criminal context, the fate of *Frye* in Texas appears precarious. *See, e.g., Kelly v. State*, 792 S.W.2d 579, 584-85 (Tex.App. – Fort Worth 1990, pet. granted) (criticizing *Frye*, questioning whether Texas still adheres to *Frye*, and advocating general relevancy test in place of *Frye*).

[49] Despite the vigorous promotion of the Federal Rules in *Hanna v. Plumer*, 380 U.S. 460, 85 S.Ct. 1136, 14 L.Ed.2d 8 (1965), we have noted proper occasions for applying *Hanna*'s dictum that a court "need not wholly blind itself to the degree to which the Rule makes the character and result of the federal litigation stray from the course it would follow in state courts," 380 U.S. at 473, 85 S.Ct. at 1145. *Weems v. McCloud*, 619 F.2d 1081, 1097-98 n. 38 (5th Cir. 1980).

horizons and thus invade "evidentiary rules ... so bound up with state substantive law that federal courts sitting in Texas should accord [them] the same treatment as state courts in order to give full effect to Texas' substantive policy." *Conway v. Chemical Leaman Tank Lines, Inc.*, 540 F.2d 837, 838 (5th Cir. 1976).[50]

This deference to state substantive policy becomes so much more persuasive where, as here, the contents of the state and federal evidence rules are identical, but the federal rule becomes freighted with burdens that depart from both state and federal jurisprudence. Congress has not ordered these changes in the Federal Rules of Evidence. Nor has the Supreme Court done so. By what possible right do we do so? And now where do we turn for an appreciation of federalism and judicial restraint?

The *per curiam* is unacceptable. I dissent.

KING, Circuit Judge, with whom, REAVLEY, JOHNSON and WIENER, Circuit Judges, join dissenting:

I concur fully in Judge Reavley's thorough and forceful dissent, and I agree with Chief Judge Clark's careful analysis of Rules 702 and 703. I write separately to emphasize what I perceive to be the message and import of the majority opinion.

The tremendous impact of the majority opinion comes not from the opinion itself, but from the simple fact that it could be written at all in the face of the summary judgment record described with such care by Judge Reavley. The juxtaposition of the majority opinion and the record in this case sends a clear message to the district courts in this circuit. Henceforth, a dispute among qualified experts as to the appropriate scientific methodology or reasoning that an expert in the particular field should use to connect the facts to his conclusions is to be resolved by the district judge. If the district judge resolves this aspect of the battle among the experts by

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[50] *Cf. Bailey*, 455 F.2d at 397 (between federal and state evidentiary rules, rule which favors reception of evidence governs), *cited with approval* in *Adams v. Fuqua Indus., Inc.*, 820 F.2d 271, 273 (8th Cir.1987) ("Where a state and federal evidentiary rule conflict, the proponent is entitled 'to the benefit of the more favorable rule.'").

concluding that the plaintiff's expert has employed a methodology or reasoning which has not gained general acceptance in the scientific community, the case is to be terminated before trial. The jury will no longer be the arbiter of disputes over alternative forms of scientific methodology or reasoning.

Lest anyone misunderstand, at root this is not a case about the Federal Rules of Evidence, albeit that two of them may have been mangled in the process. It is instead about the outcomes in toxic tort cases.[1] What the majority is saying is that in its view, the outcomes in toxic tort cases that have been left to the jury have too often been unacceptable. The majority's solution is to re-write the Federal Rules of Evidence, which have been on the books for more than half a century and which, implicitly, have too often been misapplied by "our able trial colleagues."

In terms of its practical impact, today's decision will require a penurious plaintiff represented by a personal injury lawyer on a contingent fee basis, already limited in investigative and expert resources, to pass a preliminary mini-trial on his expert's methodology. At such a mini-trial, the plaintiff will be exposed to all of the industry's heavy artillery, and may be at the receiving end of a district court ruling that will eviscerate his case. To compound the injury, because the majority has conveniently used the hook of the Federal Rules of Evidence, rather than openly announcing a new principle of federal substantive law,[2] the district court's ruling will

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[1] Because the majority employs the Federal Rules of Evidence in its mission, however, one can reasonably predict that today's new rules will wreak havoc in many other types of cases as well.

[2] I recognize that the application of a rule of evidence can have a determinative impact on the outcome of a case without being appropriately considered a rule of substantive law. But the interpretation of Rules 702 and 703 announced today goes beyond the proper scope of a rule of evidence because it dramatically affects substantive rights in whole categories of cases. For example, there are diseases that are sufficiently uncommon as to be relatively unexplored in the scientific community and for which all that a plaintiff will be able to offer is testimony based on a considered medical hypothesis as to causation, not a methodology or reasoning that is generally accepted in the relevant scientific community. There are other diseases that may be increasingly common, such as asbestos-induced mesothelioma was many years ago, but are still in early stages of scientific discovery and for which all that a plaintiff again will be able to offer is testimony based on a considered medical hypothesis as to causation. Even though qualified experts for these plaintiffs may be of the opinion that causation has been established to a reasonable medical probability, today's decision on Rules 702 and 703 precludes

be reviewed under the manifestly erroneous standard. Plaintiffs attempting to establish liability in areas in which scientific methodology or reasoning is not yet well-established will face a nearly insurmountable burden. The result will be to deprive plaintiffs with possibly meritorious claims of a jury's assessment of their right to recovery.

As Judge Reavley and Chief Judge Clark make abundantly clear, the majority disregards the plain language of Rules 702 and 703 in its zeal to approve the district court's dismissal of the plaintiff's evidence in this case. Based on an intellectual elitism that prefers to entrust scientific evaluation to a judge, trained in law, rather than to the good sense of the community, the majority judicially amends the Federal Rules of Evidence in order to deprive the plaintiff of his or her day in court. Before today's decision, I should have thought that a dispute among qualified experts would preclude, not mandate, summary judgment.

The majority, so willing to decry judicial activism in other contexts such as prison overcrowding or supervision over schools, engages in the worst sort of judicial legislation. Undoubtedly, modern toxic tort litigation presents novel, challenging problems for the courts. Such cases may encompass massive numbers of plaintiffs, may involve scientific disputes which the courts are sometimes ill-suited to resolve, and may cause severe and perhaps unwise economic disruptions. If the Federal Rules of Evidence are inadequate in this context, however, then Congress, who enacted them, is the proper branch to amend or repeal them. If a federal substantive rule needs to be devised to supplant state law criteria for recovery, then Congress is the proper branch to devise it.

But at least until now, the decisions when and under what circumstances corporate America or its insurers pay in the area of toxic torts have not been vested by the Constitution or the Supreme Court in federal judges. Those decisions have been determined by state law, as applied by juries. Today's decision places a far greater

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recovery for these plaintiffs in federal court because these experts may be employing a methodology or reasoning that has yet to gain general acceptance in the scientific community. The Texas state courts would clearly permit such a case to go to trial and the jury to assess the weight and sufficiency of the plaintiff's evidence. As newly constructed by the majority, Rules 702 and 703 have crossed the line between rules of evidence and principles of substantive law.

hurdle in the path of toxic tort plaintiffs in federal court than such plaintiffs face in a state forum. This lack of congruence with the state courts in cases dependent on our diversity jurisdiction is fundamentally at odds with the Supreme Court's decision in *Erie*. As a result, we encourage reverse forum shopping and deprive plaintiffs of the substantive rights that should be available to them under state law.

The majority, in its haste to achieve more acceptable results, tramples on fundamental Constitutional principles that one might have expected this court, above all others, to hold dear -- the separation of powers between Congress and the federal courts, the right to a jury trial and the role of the states in our federal system. With the mandate of neither Congress nor the Supreme Court, we today create federal substantive law, through the technique of amending the Federal Rules of Evidence, in order to tilt toxic tort litigation in favor of defendants. Such result-oriented decision-making can only erode respect for the federal judiciary.

APPENDIX B

UNITED STATES COURT OF APPEALS
For the Fifth Circuit

No. 89-1995

ROSEMARIE CHRISTOPHERSEN
Surviving Spouse of Albert Roy
Christophersen, Deceased, and
STEVEN ROY CHRISTOPHERSEN,

Plaintiffs-Appellants,

VERSUS

ALLIED-SIGNAL CORPORATION,
INC., ALLOYS INTERNATIONAL, INC.,
UNITED CATALYSTS, INC.,
THE HALL CHEMICAL COMPANY,
MARATHON MANUFACTURING COMPANY, and
CP CHEMICALS, INC.,

Defendants-Appellees.

Appeal from the United States District Court
For the Western District of Texas

(June 4, 1990)

Before REAVLEY, KING and JOHNSON, Circuit Judges

REAVLEY, Circuit Judge.

On motion for summary judgment, the district court determined that the opinion of plaintiffs' expert witness should be excluded because it was unreliable. The exclusion of this evidence left

plaintiffs without any support in the record for their contention that Albert Roy Christophersen's exposure to nickel and cadmium caused the cancer that resulted in his death. For that reason the court granted the defendants' summary judgment motion. Rosemarie Christophersen and Steven Roy Christophersen, the surviving spouse and son of the decedent, seek reversal and argue that the court erred in disregarding their expert witness' opinion evidence. Because we agree that plaintiffs did raise an issue on a causal relation between a marketing defect and the cancer, we reverse the judgment and remand the case.

I.

Albert Roy Christophersen died in March of 1986 as a result of cancer that originated in his colon and metastasized to his liver. During the fourteen years preceding his death, Christophersen worked for Marathon Manufacturing Company at its plant in Waco, Texas. At its Waco operation, Marathon among other things engages in the production of nickel/cadmium batteries. Christophersen never was directly involved in the production of these batteries. The record, however, indicates that over a number of years Christophersen's job duties required him to visit the area of the plant in which the batteries were manufactured. During these visits, Christophersen was exposed to fumes resulting from the manufacturing process. Plaintiffs contend that these fumes contained particles of nickel and cadmium and that Christophersen's exposure to these heavy metals caused the cancer that resulted in his death.

Plaintiffs brought suit pursuant to the Texas Wrongful Death and Survival Statute, Tex.Civ.Prac. & Rem.Code Ann. §§ 71.001-031 (Vernon 1986), against Marathon and a number of companies that supplied Marathon with chemicals and other materials used in the manufacture of the nickel/cadmium batteries. Plaintiffs' complaint alleged that the products used in the production of the batteries were defectively designed, manufactured, and marketed and were producing causes of the cancer that resulted in Christophersen's death. The complaint also alleged that Marathon was aware of the dangerous nature of the chemicals and products and failed either to provide Christophersen a safe place to work or to warn him of the

dangerous conditions that existed at the plant. Defendants moved for summary judgment.

In considering plaintiffs' marketing defect claim,[1] the court focused on the affidavit of plaintiffs' expert witness, Dr. Lawrence Miller, who indicated that Christophersen's exposure to nickel and cadmium at Marathon caused the cancer that resulted in his death. The court undertook an in-depth review of the bases for Dr. Miller's conclusion and determined that his opinion should be excluded. This ruling left plaintiffs without any evidence linking Christophersen's cancer to his exposure to nickel and cadmium, and the court held that, absent evidence creating an issue of material fact with regard to causation, summary judgment on the marketing defect claim was appropriate.

II.

A.

Before a court may grant summary judgment, the moving party must demonstrate that it is entitled to judgment as a matter of law because there is no actual dispute as to an essential element of the plaintiff's case. Fed.R.Civ.P. 56(c); *see Washington v. Armstrong World Indus.*, 839 F.2d 1121, 1122 (5th Cir. 1988); *Impossible Elecs. Techniques, Inc. v. Wackenhut Protective Sys.*, 669 F.2d 1026, 1031 (5th Cir. Unit B 1982). In this case, the district court considered Dr. Miller's affidavit as the only evidence supporting plaintiffs' claim of causation. Plaintiffs do not contend otherwise. Therefore, if the district court properly determined that Dr. Miller's conclusion should be excluded, the grant of summary judgment was appropriate.

[1] Plaintiffs do not challenge the court's ruling that they failed to raise an issue of defective design or manufacture of the chemicals and other materials used in the production of the batteries.

B.

The district court based its decision to exclude the causation evidence on its determination that Dr. Miller's conclusion was unreliable.[2] Our decisions indicate that the court's determination in this regard may be reversed only if it was manifestly erroneous. *See Washington*, 839 F.2d at 1123; *Viterbo v. Dow Chem. Co.*, 826 F.2d 420, 422 (5th Cir. 1987). We have also held, however, that in undertaking its inquiry into the admissibility of expert testimony a court should accord "proper deference to the jury's role as the arbiter of disputes between conflicting opinions. As a general rule, questions relating to the bases and sources of an expert's opinion affect the weight to be assigned that opinion rather than its admissibility and should be left for the jury's consideration." *Id.* at 422; *see Dixon v. International Harvester Co.*, 754 F.2d 573, 580 (5th Cir. 1985) (noting that once a witness is "properly admitted as an expert, the jury [is] at liberty to accept or reject his testimony, and to judge his credibility"). Thus, a court should exclude an expert opinion only if it is "fundamentally unsupported" and "would not actually assist the jury in arriving at an intelligent and sound verdict." *Viterbo*, 826 F.2d at 422.

In an affidavit submitted to the district court, Dr. Miller reached the following conclusion:

> Based upon my review of the medical records, research literature, my education and experience, it is my opinion that, more likely than not, the metastatic cancer which caused the death of Mr. Christophersen was caused by his exposure to toxic nickel and cadmium fumes during his lifetime. I have reached this opinion after conducting extensive research and

[2] The district court couched its decision in the language of Rule 403 and Rule 703 of the Federal Rules of Evidence, stating: "Dr. Miller's testimony should be stricken as it is not based upon the type of evidence usually relied upon by experts in the field of cancer research. The introduction of Dr. Miller's testimony at a trial would be more prejudicial than probative." A review of the court's memorandum opinion, however, reveals that the court did not distinguish between the Rule 403 and Rule 703 analysis and simply excluded the testimony after it determined that the expert opinion as a whole, rather than the individual sources of information on which the expert based his conclusions, was unreliable. Under these circumstances, our task is to determine whether the district court properly held that Dr. Miller's testimony was so unreliable as to justify its exclusion.

investigation into this matter and my opinion is based upon reasonable medical probability.

Counsel for defendants explored the bases for this conclusion during an extensive oral deposition. In its memorandum opinion, the district court focused its analysis on three types of information that Dr. Miller relied on in forming his conclusions.

Evidence of Exposure. -- Most of the information Dr. Miller received regarding Christophersen's exposure to nickel and cadmium came from the affidavit of Edgar G. Manoliu, a former employee at Marathon's Waco plant. This affidavit indicated that over a fourteen-year period Christophersen's duties required him to regularly visit areas of the Marathon plant in which he was exposed to "many fumes and gases," including "airborne particles of cadmium and nickel alloys." Dr. Miller relied on these statements and other information from plaintiffs' counsel in concluding that Christophersen's employment history at Marathon "included extensive exposure to nickel and cadmium fumes." The district court took issue with Dr. Miller's conclusion, primarily because there was no indication of the chemical composition of the fumes in the plant or the level of exposure, and found that "Dr. Miller could not base a reliable opinion solely upon the information provided in the Manoliu affidavit."

Although the district court certainly was correct in observing that evidence concerning the chemical composition of the fumes in the Marathon plant and the level of exposure would be helpful, the court erred to the extent that it held the absence of such information rendered Dr. Miller's opinion unreliable. In his deposition, Dr. Miller noted that "in general there appears to be a dose-response effect for [nickel and cadmium] in terms of their carcinogenicity." "That is, the greater the dose . . : on a daily basis [and] the dose over time," the higher the risk of the development of cancer. Dr. Miller also indicated, however, that the dose-response relationship could not be applied to individual cases, and thus knowledge of the precise level of exposure on a daily basis would not necessarily be of benefit in reaching an accurate conclusion as to the cause of an individual's cancer. With regard to Christophersen's cancer, Dr. Miller apparently placed primary emphasis on the exposure over time and indicated that so long as "the general dates are correct in

terms of the dates of exposure, the general amounts of exposure based on number of visits made to the area and a general description of the time spent in the area," his conclusions would remain unaffected. Dr. Miller was entitled to rely on the information provided him in formulating his opinions, *see Peteet v. Dow Chem. Co.*, 868 F.2d 1428, 1432 (5th Cir.), *cert. denied*, U.S., 110 S.Ct. 328, 107 L.Ed.2d 318 (1989), and he apparently determined that the information was sufficient to allow him to make a finding. At trial defendants certainly may challenge the factual basis for Dr. Miller's conclusions and argue that additional information was necessary in order to make an accurate finding on causation, but these arguments go to the weight to be accorded Dr. Miller's opinion and not to its admissibility.

Pathogenesis of Small Cell Carcinoma. -- Christophersen's medical and autopsy records indicate that he died as the result of small cell carcinoma of the colon that metastasized to his liver. In his deposition, Dr. Miller testified that small cell carcinoma is an unusual form of cancer that has been linked to changes in the genetic material in cells caused by exposure to toxic substances. When these altered cells replicate, the resulting or daughter cells may retain the genetic alteration and become cancerous. Dr. Miller indicated that small cell carcinoma in the lung had been associated with nickel and cadmium exposure and went on to suggest that, "[based] on what's known about the biochemical nature of small--cell" carcinoma, "the same sorts of chemicals and exposures that are associated with small-cell carcinoma of the lung are likely to be associated with small-cell carcinoma elsewhere in the body."

The district court again took issue with the basis of Dr. Miller's analysis, stating: "Dr. Miller presents no authority for his opinion that a primary small cell cancer of the colon has the same pathogenesis as a primary small cell cancer of the lung simply because their appearance is similar." This characterization of the testimony, however, thoroughly distorts Dr. Miller's analysis. Nowhere in his deposition testimony does Dr. Miller even suggest that the mere similarity of appearance between the cancer cells was the key to his reasoning. As is suggested above, a full review of the deposition indicates that this aspect of Dr. Miller's analysis was based on the nature of the biochemical reaction that results in the development of small cell carcinoma. The district court's simplistic characterization

of the analysis has no relevance to this more sophisticated line of reasoning.

The record does contain the affidavits of several doctors who are critical of Dr. Miller's conclusions. These affidavits primarily address the need for epidemiological and animal studies specifically linking nickel and cadmium exposure to colon cancer, an issue addressed *infra*. The affidavits, however, briefly address Dr. Miller's analysis regarding the origin of small cell carcinoma. Dr. Sherwood Gorbach concludes that "Dr. Miller's presumption that nickel and cadmium have been associated with a certain type of cell in lung cancer and therefore should be associated with a similar type of cell in the colon has no support in medical science and is without foundation." Dr. Richard Rudders states:

> Dr. Miller's assertion that small cell colon cancer and small cell lung cancer have the same pathogenesis because the cells have the same size when viewed under a microscope is without basis in fact and has no scientific merit. These tumors in fact have to my knowledge never been shown to have a common causation or share a proven common origin.

As did the district court, the first sentence of the excerpt from Dr. Rudders' affidavit mischaracterizes Dr. Miller's testimony. The second sentence and the excerpt from Dr. Gorbach's affidavit create at best a conflict between experts. Nevertheless, relying on these conclusory statements and its own interpretation of the testimony, the district court concludes that "Dr. Miller's supposition that a small cell carcinoma of the lung is likely to be associated with a small cell carcinoma located elsewhere in the body is 'without precedent in cancer epidemiology and is not scientifically correct.'"[3] In so holding, the court, on the basis of affidavits and thus without the benefit of development of the opinions through cross-examination, simply chose sides in this battle of the experts and thereby usurped the role of the jury in evaluating the evidence and the credibility of expert witnesses.

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[3] In setting forth this conclusion, the court quotes from the affidavit of Dr. Rudders. The portion of that affidavit from which the quote is taken, however, deals not with Dr. Miller's analysis regarding the origin of small cell carcinoma but with the need for epidemiological or animal studies linking nickel and cadmium exposure specifically to colon cancer.

Medical Literature. -- Bolstered by the affidavits of Dr. Gorbach and Dr. Rudders, the district court concluded that Dr. Miller's opinion was inadmissible because it was not based on epidemiological, animal, or in vitro studies showing a "statistically significant link between colon cancer and exposure to nickel and/or cadmium." Dr. Miller agreed that these were the three main types of evidence used to establish cancer causation. Dr. Miller also admitted that he was not aware of any articles or studies specifically linking nickel and cadmium exposure to small cell cancer of the colon. He nevertheless concluded that the state of medical knowledge was such that, based upon a more likely than not standard, he could conclude that Christophersen's exposure to nickel and cadmium at Marathon caused his cancer.

In support of his conclusions, Dr. Miller noted that nickel and cadmium are known to be carcinogenic in humans. Dr. Miller also indicated that studies had linked nickel and/or cadmium exposure to lung, kidney, and prostate cancer. Dr. Miller discussed his theory as to how the nickel and cadmium that Christophersen inhaled at Marathon reached his colon, there causing genetic alterations that resulted in the cancer. In reaching his conclusions, Dr. Miller took into consideration the duration of Christophersen's exposure to nickel and cadmium and the absence of evidence of exposure to other potentially carcinogenic substances such as asbestos or alcohol. These are methodologies that physicians traditionally rely on in diagnosing the cause of a particular patient's cancer. *See Osburn v. Anchor Laboratories, Inc.*, 825 F.2d 908, 915-16 (5th Cir. 1987), *cert. denied*, 485 U.S. 1009, 108 S.Ct. 1476, 99 L.Ed.2d 705 (1988). The district court should have permitted plaintiffs to present their causation evidence to the jury, which could then "determine the appropriate weight to be given to the testimony." *In re Japanese Elec. Prods. Antitrust Litig.*, 723 F.2d 238, 278 (3d Cir. 1983), *rev'd in part on other grounds*, 475 U.S. 574, 106 S.Ct. 1348, 89 L.Ed.2d 538 (1986); *see Osburn*, 825 F.2d at 915 (holding that "medical expert opinion testimony that is controversial in its conclusions can support a jury finding of causation as long as the doctor's conclusory opinion is based upon well-founded methodologies").

Courts have not required the proof or expert testimony concerning causation in toxic tort cases to be supported by epidemiological studies establishing a cause-effect relationship. *See City of Green-*

ville v. W.R. Grace & Co., 827 F.2d 975, 980 n. 2 (4th Cir. 1987); *Wells v. Ortho Pharmaceutical Corp.*, 788 F.2d 741, 745 (11th Cir.), *cert. denied*, 479 U.S. 950, 107 S.Ct. 437, 93 L.Ed.2d 386 (1986); *Ferebee v. Chevron Chem. Co.*, 736 F.2d 1529, 1535-36 (D.C.Cir.), *cert. denied*, 469 U.S. 1062, 105 S.Ct. 545, 83 L.Ed.2d 432 (1984). The exception from this rule is this court's recent holding that absent statistically significant epidemiological proof that the drug Bendectin is a human teratogen, a plaintiff's proof that the drug caused her child's birth defects was insufficient. *See Brock v. Merrell Dow Pharmaceuticals, Inc.*, 874 F.2d 307 (5th Cir.), *modified*, 884 F.2d 166 (5th Cir. 1989), *cert. denied*, U.S., 110 S.Ct. 1511, 108 L.Ed.2d 646 (1990). The court, however, specifically declined to hold that "epidemiologic proof is a necessary element in all toxic tort cases." *Id.* at 313. Legal standards of proof have not yet reached the point where a toxic tort plaintiff may establish causation only through statistically significant epidemiological studies, thereby rendering unreliable expert testimony based on anything except such studies. *Cf. Ferebee*, 736 F.2d at 1536 (noting that "the test for allowing a plaintiff to recover in a tort suit . . . is not scientific certainty but legal sufficiency"). Moreover, we will not extend Brock. We simply apply this court's traditional position that "[an] expert's opinion need not be generally accepted in the scientific community before it can be sufficiently reliable and probative" to be submitted to the jury and perhaps support a jury finding. *Osburn*, 825 F.2d at 915.

Dr. Miller's conclusions were not so "fundamentally unsupported" that they would be of no assistance to the jury in reaching a verdict. The questions defendants raise concerning the bases for the conclusions are issues properly presented to and considered by the jury, but they do not render the opinion unreliable and therefore inadmissible. The district court erred in its decision to strike Dr. Miller's opinion evidence.

C.

Without discussion, the district court also stated that "[p]erhaps another way of reaching the same inevitable result is to determine that even if Dr. Miller's testimony were accepted as having some usefulness, it would still constitute no evidence that any Defendant

knew or should have known of a danger sufficient to require a warning." To the contrary, Dr. Miller's affidavit and deposition testimony that indicate the potential carcinogenicity of nickel and cadmium also suggest that the risks of exposure may have been known as early as 1976. The record contains no evidence, however, that Marathon or its suppliers ever provided persons who would be exposed to the chemicals with a warning of these risks.[4]

We sustain the dismissal of plaintiffs' claims of design and manufacturing defects. Otherwise, the judgment is reversed and the cause is remanded.

[4] Marathon suggests that we should affirm the grant of summary judgment as to it even if we reverse the judgment as to the other defendants. Marathon points out that it can be held liable only if it was grossly negligent, *see* Tex.Rev.Civ.Stat. Ann. art. 8306 § 5 (Vernon 1967), and contends that gross negligence can be shown only through expert testimony. On this record, we cannot conclude that there is no genuine issue of fact as to whether Marathon was grossly negligent.

APPENDIX C

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

ROSEMARIE CHRISTOPHERSEN, et al.,	)	
Plaintiffs,	)	CIVIL ACTION NO. W-88-CA-098
v.	)	
ALLIED CHEMICAL CORPORATION, et al.,	)	
Defendants.	)	

ORDER

This toxic tort case arises out of the death of Albert Roy Christophersen ("Christophersen"). The Plaintiffs are the decedent's son and surviving spouse (the "Plaintiffs"). Jurisdiction in this court is based upon diversity of citizenship.

I. Background

Christophersen worked for defendant Marathon Manufacturing Company ("Marathon"), formerly Marathon Battery Company, from 1966 until his death from cancer in March of 1986. Christophersen was a design engineer and an applications engineer for Marathon, and had also worked in the sales department at one time. Christophersen died in 1986 of a rare, small-cell form of cancer which originated in his colon and metastasized to his liver.

Marathon manufactures and distributes nickel/cadmium batteries, and the basis of Plaintiffs' complaint is that Christophersen's cancer and subsequent death were the result of his long-term exposure to

the nickel and cadmium fumes which result during manufacturing. The other defendants named in this suit supplied the chemicals necessary for the battery manufacturing process at different times during Christophersen's employment with Marathon.

Plaintiffs bring this action based upon a theory of strict liability. Plaintiffs allege that the defendants are liable for the death of Christophersen based upon design, manufacturing, and marketing defects in the nickel and cadmium used in the battery manufacturing process. Plaintiffs also allege that Marathon knew of the dangerous propensities of the chemicals involved but failed to warn Christophersen of these dangers and failed to provide Christophersen with a reasonably safe place to work. Defendants move for summary judgment on two grounds: (1) that there is no evidence that the nickel and cadmium used were either improperly designed or manufactured, and (2) that there is no evidence that exposure to nickel/cadmium fumes causes the form of cancer which affected Christophersen.

II. Summary Judgment

Summary judgment is appropriate only if "there is no genuine issue as to any material fact and . . . the moving party is entitled to a judgment as a matter of law." Fed.R.Civ.P. 56(c). The party seeking summary judgment bears an "exacting burden of demonstrating that there is no actual dispute as to any material fact in the case." *Impossible Electronic Techniques, Inc. v. Wackenhut Protective Systems, Inc.*, 669 F.2d 1026, 1031 (5th Cir. 1982).

In determining whether the movant has met its burden, the Court must view the evidence introduced and all factual inferences from that evidence in the light most favorable to the party opposing summary judgment. *Id.* All reasonable doubts as to the existence of a genuine issue of material fact must be resolved against the movant. *Id.*; *Jones v. Western Geophysical Co. of America*, 669 F.2d 280, 283 (5th Cir. 1982). When determining whether to grant summary judgment, the Court is merely determining whether a factual dispute exists and is not required to resolve those disputes. *See Jones*, 669, F.2d at 283. The fact that it appears to the Court that the non-moving party is unlikely to prevail at trial or that the movant's statement of facts appears more plausible is not a reason

to grant summary judgment. *Id.*

Once the movant has shown the absence of material factual issues, the opposing party has a duty to respond with any factual assertion that would preclude summary judgment. *Kleckner v. Republic Van & Storage Co.*, 556 F.2d 766, 771 (5th Cir. 1977). Rule 56(e) of the Federal Rules of Civil Procedure provides that "[w]hen a motion for summary judgment is made and supported as provided in this rule, an adverse party may not rest upon the mere allegations or denials of his pleading, but his response, by affidavits or as otherwise provided in this rule, must set forth specific facts showing that there is a genuine issue for trial. If he does not so respond, summary judgment, if appropriate, shall be entered against him." In this respect, the burden on the non-moving party is not especially heavy; however, he must show specific facts that present a genuine issue of material fact worthy of trial rather than showing mere general allegations. *See Gossett v. Du-Ra-Kel Corp.*, 569 F.2d 869, 872 (5th Cir. 1978).

III. Design and Manufacturing Defects

Defendants allege summary judgment is appropriate as there is no evidence that either the nickel or cadmium used in the battery manufacturing process was defective in design or manufacture.

A defendant may be liable under a strict liability theory if it places a defective product into the stream of commerce. A product is defective if it is unreasonably dangerous to the user or consumer. *Borel v. Fibreboard Paper Products Corp.*, 493 F.2d 1076, 1087 (5th Cir. 1973). An unreasonably dangerous product may result from a defect in the design, manufacture, or marketing of a product. A product is defectively designed if it is unreasonably dangerous as designed, taking into account the utility of the product and the risk involved in its use. *Rehler v. Beech Aircraft Corp.*, 777 F.2d 1072 (5th Cir. 1985). The essence of a defective design theory is that there is a safer design that could have been used, but that was not; or there are safer modifications which could have been made, but were not. The Plaintiffs allege that Christophersen's injuries arose from the inhalation of nickel and/or cadmium fumes. The Plaintiffs have presented no summary judgment proof that nickel and cadmium can be designed in any manner other than that used by

Defendants. As such, Plaintiffs have no cause of action based upon a design defect.

Nor is there any evidence that the nickel and cadmium in use at the Marathon plant were defectively manufactured. The basis of a manufacturing defect is that a product is rendered unreasonably dangerous because it is not manufactured in conformity with the manufacturer's specifications. There is no evidence presented that the nickel and cadmium in use at the Marathon plant were in a defective form. Plaintiffs' claim, therefore, rests upon their allegations of a marketing defect.

IV. Marketing Defect

A product may be defectively marketed when a Defendant fails to give an adequate warning as to the product's unreasonably dangerous condition. The lack of an adequate warning may render a product defective and unreasonably dangerous even if it has no manufacturing or design defect. *Pavlides v. Galveston Yacht Basin*, 727 F.2d 330, 338 (5th Cir. 1984). A manufacturer has a duty to warn of dangers associated with its product of which it knows or should know at the time the product is sold. *Id.* In order to prevail, Plaintiffs must additionally demonstrate that the failure to warn was a producing cause of the injuries suffered by the user. *Reyes v. Wyeth Laboratories*, 498 F.2d 1264, 1272 (5th Cir.), *cert. denied*, 419 U.S. 1096 (1974).

Defendants contend that there is absolutely no evidence that inhalation of nickel and/or cadmium fumes causes the form of cancer which affected Christophersen. Defendants offer the affidavit of Dr. Stephen Jones, an oncologist, who is of the opinion that Christophersen's colon cancer was not caused by either short-term or long-term chemical exposure, but was, instead, the result of a high-fat, low-fiber diet. In rebuttal, Plaintiffs offer the affidavits of Edgar Manoliu, a co-worker of Christophersen, and Dr. Lawrence G. Miller, an expert witness, who states that it is his opinion that Christophersen's cancer was the result of exposure to nickel and/or cadmium fumes. Defendants respond that Dr. Miller's testimony should be disregarded under Federal Rule of Evidence 703, as the testimony is not based upon the type of information upon which experts in the field of cancer research

ordinarily rely. The testimony of Dr. Miller is the only evidence Plaintiff presents linking Christophersen's death to exposure to nickel and cadmium fumes. Thus, Dr. Miller's opinion, and the basis therefore, is of paramount importance in determining the validity of Plaintiffs' claim.

V. Expert Opinion

It is the general rule that

> questions relating to the bases and sources of an expert's opinion affect the weight to be assigned that opinion rather than its admissibility and should be left for the jury's consideration.

Viterbo v. Dow Chemical Co., 826 F.2d 420, 422 (5th Cir. 1987). However, both district and appellate judges are under a duty to review an expert's testimony to ensure "that the expert has the necessary qualifications and a sufficient basis for his opinion." *Peteet v. Dow Chemical Co.*, No. 87-6314, slip opinion at 2729 (5th Cir. April 4, 1989). Further, the Fifth Circuit Court of Appeals has encouraged ". . . district judges faced with medical and epidemiologic proof . . . to be especially vigilant in scrutinizing the basis, reasoning and conclusiveness of studies presented by both sides." *Brock v. Merrell-Dow Pharmaceuticals, Inc.*, 874 F.2d 307, 315 (5th Cir. 1989).

The Court must review an expert's opinion in light of the mandates of Fed.R.Evid. 703 which requires that an expert's opinion be based upon information of a type reasonably relied upon by experts in the particular field. An opinion which is not based upon reliable information may be of such little weight that its introduction to the jury may be more prejudicial than probative under Fed.R.Evid. 403. In such a situation, the opinion may be discounted by the Court as lacking in reliable support.

> Expert testimony falls into this category when that testimony would not actually assist the jury in arriving at an intelligent and sound verdict. If an opinion is fundamentally unsupported, then it offers no expert assistance to the jury. Furthermore, its lack of reliable support may render it more prejudicial than probative, making it inadmissible under Fed.R.Evid. 403.

Viterbo v. Dow Chemical Co., 826 F.2d at 422.

The basis of the Defendants' argument is that there is a lack of significant scientific evidence linking exposure to nickel and/or cadmium fumes to small-cell cancer of the colon and that there is, therefore, no reliable basis for Dr. Miller's opinion.

Dr. Miller based his opinion upon the affidavit of Edgar Manoliu, the medical and autopsy records of Christophersen, a review of the literature, and upon his own education, experience and background. When examined individually, and as a whole, the Court has determined that there is no reliable basis for Dr. Miller's opinion that Christophersen's death was attributable to exposure to nickel and/or cadmium fumes.

A. Manoliu Affidavit.

Much of the factual information upon which Dr. Miller relied regarding the circumstances of Christophersen's employment with Marathon and exposure to nickel and cadmium was gleaned from the affidavit of Edgar D. Manoliu ("Manoliu"). Manoliu is a former employee of Marathon and worked at the Waco manufacturing plant from 1972 until 1985.

Manoliu's affidavit indicates that Christophersen visited the main production area and the impregnation and soak areas of the Marathon plant approximately two to three times per week, spending at least one-half hour per visit. Manoliu also indicates that nickel and cadmium fumes and gases were present in these areas, although there is no indication as to the level involved. The affidavit further indicates that after 1980, Christophersen's office was located in a loft located over the main production area of the plant, wherein he was regularly exposed to fumes and airborne particles generated by the manufacturing process. Again, no indication of the level of fumes or airborne particles is mentioned.

Dr. Miller concluded that Christophersen had approximately a twenty-year history of employment with Marathon, which included "extensive exposure to nickel and cadmium fumes in the workplace." Miller Affidavit. This supposition, however, was not

supported by the information in the affidavit. The Manoliu affidavit indicates that Christophersen worked only fourteen years at the Marathon plant in Waco prior to his death. Further, there was no basis for the conclusion that Christophersen's exposure to nickel and cadmium fumes was extensive as the Manoliu affidavit did not indicate the type of fumes to which Christophersen was exposed or the type of fumes generated by the battery manufacturing process. Miller Dep. Vol. I, pp. 107, 108, 109, 126, Vol. II, p. 73. Nor was there any indication of the Physical facilities at the Marathon plant, including the size of the plant or the impregnation and soak area, or the ventilation available in these areas or Christophersen's office. Miller Dep. Vol. I, p. 163, Vol. II, p. 70. Therefore, there is no indication as to what specific substances Christophersen was exposed or in what amount. The level of exposure, or dose, is an important consideration when evaluating exposure to a toxic substance, as admitted by Dr. Miller in his deposition. Miller Dep. Vol. I, pp. 56-57.

Clearly, Dr. Miller could not based a reliable opinion solely upon the information provided in the Manoliu affidavit.

B. Medical and Autopsy Records.

Part of Dr. Miller's investigation included an evaluation of the medical and autopsy records of Christophersen. These records indicate that Christophersen died from a small-cell cancer of the cecum (part of the colon), which metastasized to the liver. The basis for Dr. Miller's opinion as to the pathogenesis of Christophersen's disease is the similarity between the type of cancer suffered by Christophersen and the small cell cancer of the lung which has been associated with exposure to nickel and cadmium. Miller Dep. Vol. I, pp. 28, 45. Dr. Miller presents no authority for his opinion that a primary small cell cancer of the colon has the same pathogenesis as a primary small cell cancer of the lung simply because their appearance is similar. As Dr. Miller himself admits, similar cell appearance does not necessarily indicate same origin. Miller Dep. Vol. I, p. 13.

Dr. Miller is not an expert in either oncology or pathology. Miller Dep. Vol. I, pp. 24, 55, 35-37, 202; Vol. II, pp. 2-18. Dr. Miller's opinion as to the cause of Christophersen's death was

formed without consultation with oncologists or other cancer specialists. Miller Dep. Vol. I., pp. 162, 211. Dr. Miller's experience with cancer occurred during his residency when he assisted in a study of the immune system as affected by smoking and asbestos. Miller Dep. Vol. I, pp. 168-69. Dr. Miller does not routinely treat cancer patients, nor has he ever treated a patient with a colon cancer of the type that affected Christophersen. Miller Dep. Vol. I, pp. 211, 213.

Dr. Miller's opinion is severely criticized by Dr. Richard Allan Rudders, Professor of Medicine in the Division of Hematology and Oncology of the Department of Medicine at Tufts University, and Dr. Sherwood Leslie Gorbach, Professor of Medicine, Professor of Molecular Biology and Microbiology, and Professor of Community Health at Tufts University School of Medicine. The Plaintiff has not questioned the credentials of these experts. These authorities indicate that the determination of the pathogenesis of a particular form of cancer requires human epidemiologic studies, live animal testing, and in vitro cell testing. Dr. Miller concurs that these are the main types of evidence which establish causation. Miller Dep. Vol. I, p. 16. Despite this, however, Dr. Miller formed his opinion without ever seeing an epidemiological study specifically dealing with small cell carcinoma of the colon. Miller Dep. Vol. I, p. 52. Dr. Miller's supposition that a small cell carcinoma of the lung is likely to be associated with small cell carcinoma located elsewhere in the body is "without precedent in cancer epidemiology and is not scientifically correct." Rudders Affidavit.

C. Review of the Medical Literature.

Dr. Miller testifies in his deposition that his opinion is supported by the medical literature. As stated previously, causation in an area such as this must be established through animal, epidemiological, and in vitro studies. Dr. Miller, however, testified that he had not reviewed any animal studies demonstrating a link between colon cancer and exposure to nickel and cadmium. Miller Dep. Vol. I, pp. 93, 125. Nor has Dr. Miller pointed to any statistically significant epidemiological studies indicating such a link. Miller Dep. Vol. I, pp. 85-87, 89-90, 206; Vol. II, pp. 83, 87. Although some studies link exposure to nickel and cadmium with an increased

incidence of cancer, they do not indicate a specific link between small cell cancer of the colon and exposure to nickel and cadmium fumes. Miller Dep. Vol. II, p. 83.

The two main epidemiological studies relied upon by Dr. Miller are "Site-Specific Cancer Mortality Among Workers Involved in the Production of High Nickel Alloys," by C.K. Redmond, and "Incidence of Cancer Among Workers Producing Calcium Carbide," by H. Kjuus, A. Andersen, and S. Langard. Dr. Miller indicates that there are no other studies besides these which indicate an increase in colon cancer from exposure to nickel and/or cadmium. Miller Dep. Vol. I, p. 91.

The Redmond study involves nickel alloy workers rather than workers who manufacture nickel-cadmium batteries. The study does indicate a possible increase in cancer of the liver and large intestine among nickel alloy workers; however, the study specifically declines to draw any conclusions regarding a causal connection between these cancer sites and exposure to nickel. Redmond article, p. 73. Further, the observed cancers of the large intestine evidence a statistically significant standardized mortality ratio only for non-white males. Redmond article, p. 84.

The Kjuus study involves male employees at a plant producing calcium carbide. The study found a significant excess of colonic cancer and of prostatic cancer among the calcium carbide workers. Kjuus article, p. 242. The only discussion in the article regarding cadmium occurs in connection with a possible link to prostatic cancer. Kjuus article, pp. 241-242. The study does not discuss nor draw any type of conclusion as to any possible link between cancer of the colon and exposure to cadmium.

There is, therefore, no basis for Dr. Miller's assertion that the medical literature presents a statistically significant link between colon cancer and exposure to nickel and/or cadmium.

After reviewing the argument of counsel, the deposition of Dr. Miller, and the summary judgment proof presented, the Court is of the opinion that Dr. Miller's testimony should be stricken as it is not based upon the type of evidence usually relied upon by experts in the field of cancer research. The introduction of Dr. Miller's testimony at a trial would be more prejudicial than probative.

Perhaps another way of reaching the same inevitable result is to determine that even if Dr. Miller's testimony were accepted as having some usefulness, it would still constitute no evidence that

any Defendant knew or should have known of a danger sufficient to require a warning.

Dr. Miller's testimony is the only evidence presented by Plaintiff establishing a link between the death of Christophersen and his exposure to nickel and/or cadmium at the Marathon plant in Waco. Accordingly, there is no issue of material fact as to whether Christophersen's exposure to nickel and cadmium was a producing cause of his death.

Plaintiff has also filed a motion to compel Marathon to produce the medical records of other employees at its battery manufacturing plant in Waco. However, Plaintiff has not established that these records will be relevant to any issue in the case or that they will lead to the discovery of relevant information. Dr. Miller is the only expert on causation identified by the Plaintiff. Dr. Miller's deposition indicates that his opinion was formed without considering the possible incidence of cancer among other workers at the Marathon plant, and that his opinion would remain the same if there were no other occurrences of cancer among the Marathon employees. Miller Dep. Vol. II, pp. 181-182. Accordingly, it is

ORDERED that Plaintiff's Motion to Compel is hereby DENIED.

It is further ORDERED that the Defendants' Motion for Summary Judgment is hereby GRANTED.

SIGNED this 12th day of October, 1989.

WALTER S. SMITH, JR.
UNITED STATES DISTRICT JUDGE